Voltronics CORPORATION

The Trimmer Capacitor Company

PRECISION TRIMMER CAPACITORS

SEALED, NON-ROTATING PISTON
GLASS • QUARTZ • AIR
SAPPHIRE • TEFLON
NON-MAGNETIC • SURFACE MOUNT

DRO & MICROWAVE TUNERS

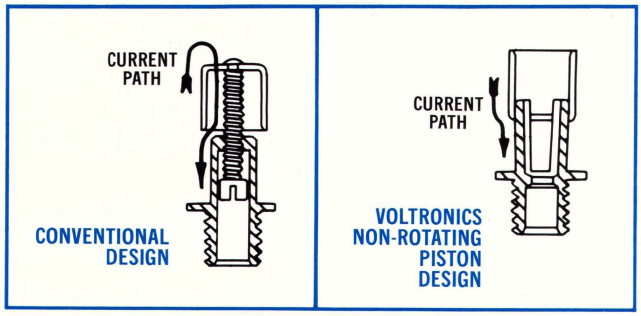
Product Selection Guide

	Page	Series	Maximum Capacitance	Maximum Frequency	Surface Mount
Specials	1				
Air Dielectric	2-6	A, E, K & KE	14pF	1.5 GHz	YES
Teflon Dielectric High Voltage	7-11	A, E, K & KE-HV	40pF	1.5 GHz	YES
Sapphire Dielectric	12-13	P	8pF	10 GHz	YES
***Non-magnetic**	14-17	NM	120pF	1.5 GHz	YES
DRO & Microwave Cavity Tuners	18-21			40 GHz	NO
Glass & Quartz Dielectric					
General Specifications	22				
Smallest Sealed MIL Styles	23	S	40pF	500 MHz	YES
Horizontal PC Mount	24-25	TP & QP	180pF	500 MHz	NO
Panel Mount	26-27	TM & QM	180pF	500 MHz	NO
Vertical PC Mount	28	TF	36pF	500 MHz	NO
Highest Capacitance Values	29	H	250pF	500 MHz	YES
Differential	30			500 MHz	NO
Split Stator	30			500 MHz	NO
Inductors - Fixed	31			500 MHz	NO
Teflon Dielectric, 15KV	32	NT	85pF	500 MHz	NO
Engineering Prototype Kits	33				
Tuning Tools	33				

*NOTE: Most trimmers in this catalog can be ordered as non-magnetic.
Consult factory for your specific needs.

THE ELECTRICAL ADVANTAGES OF VOLTRONICS GLASS DIELECTRIC NON-ROTATING PISTON DESIGN

In the Voltronics design the current flows from the piston directly to the arms of the bushing on which it slides. This provides the shortest possible RF current path for minimum inductance and resistance. Q's are 25% to 100% higher than rotating piston designs. The inductance is constant regardless of capacitance setting. Self resonances are typically above 1.2 GHz for 10 pF units whereas trimmers in which RF current flows along screw will resonate at 100 to 200 MHz.



DIMENSIONS: All dimensions are in inches. Each sheet has a cross reference to millimeters for each dimension.

Voltronics CORPORATION
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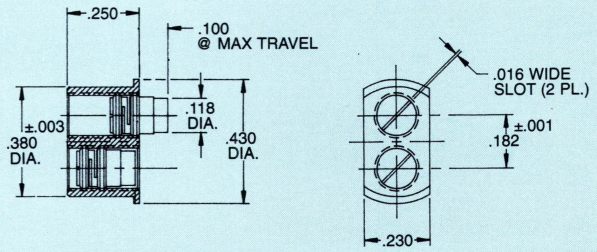
Specials

IF YOU CAN'T FIND THE PERFECT PART FOR YOUR CIRCUIT IN THIS CATALOG, WE'LL DESIGN IT

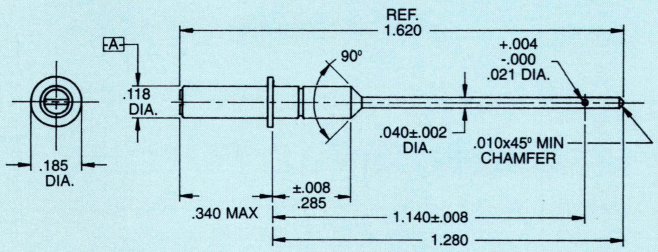
For over 30 years Voltronics has been designing variable capacitors and tuners to meet specific customer requirements. Many of the products shown in this catalog resulted from customer requests. Call us and our engineers will modify a current design or create a new one for you.

The parts shown below are a representative sampling of the 3,008 "specials" we have designed. In most cases there is no additional charge.

DUAL MICROWAVE TUNER

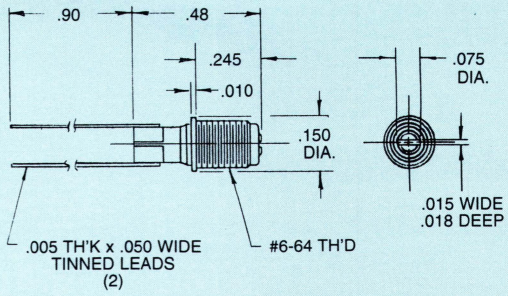


4.5 pF SAPPHIRE DIELECTRIC WITH SPECIAL TERMINAL



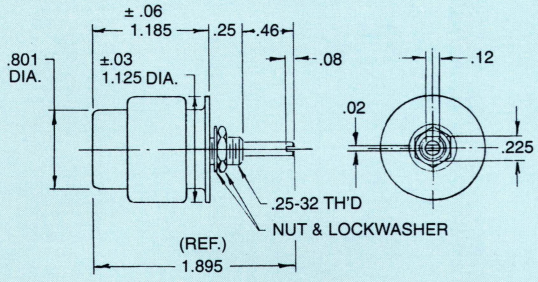
NOTES:
1. CAPACITANCE RANGE: 0.6pF TO 4.5pF
2. D.C. WORKING VOLTAGE: 500
3. D.C. WITHSTANDING VOLTAGE: 1000
4. QUALITY FACTOR (AT 250 MHz): 3000 MIN.
5. TUNING TORQUE: 0.2 TO 2.0 IN-OZ
6. OPERATING TEMPERATURE: -55°C TO +125°C

HIGH FREQUENCY SPLIT STATOR TRIMMER FOR PHASE SHIFTERS



NOTES:
1. RANGE PLATE TO PLATE: MIN. < 0.6 TO MAX > 2.0pF
2. D.C. WORKING VOLTAGE: 500
3. D.C. WITHSTANDING VOLTAGE: 1000
4. OPERATING TEMPERATURE: -55°C TO +125°C
5. TEMPERATURE COEFFICIENT: 0±75ppm/°C
6. QUALITY FACTOR (AT 250 MHz): 1500 MIN.
7. TUNING TORQUE: 0.2 TO 2.0 IN-OZ
8. CONSTRUCTION: UNSEALED, NON-ROTATING PISTON

HIGH VOLTAGE TEFLON DIELECTRIC NON-MAGNETIC



NOTES:
1. CAPACITANCE RANGE: .1pF TO 1.0pF
2. PEAK RF VOLTAGE RATING (AT 100 MHz): 20,000
3. QUALITY FACTOR (AT 25 MHz): 2000 MIN.
4. TUNING TORQUE: 0.5 TO 4.0 IN-OZ.
5. INSULATION RESISTANCE: 10^6 MEGOHMS AT 25°C
6. OPERATING TEMPERATURE: -55°C TO +125°C

Voltronics CORPORATION
The Trimmer Capacitor Company

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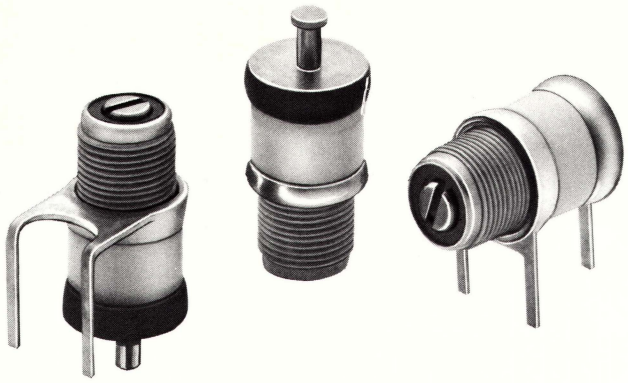
Air Trimmer Capacitors



U.S. Patent No. 3,483,450

THE ONLY INTERNALLY-SEALED AIR TRIMMER

Voltronics' concentric ring air trimmer capacitors are designed for use at frequencies up to 1.5 GHz. They are ideal for applications such as mobile radios, aerospace communication, crystal oscillators and filters, radar, cable TV, and innumerable other commercial and military programs. The unique internal O-ring seal makes wave soldering and vapor degreasing possible without the need to attach a separate cap.

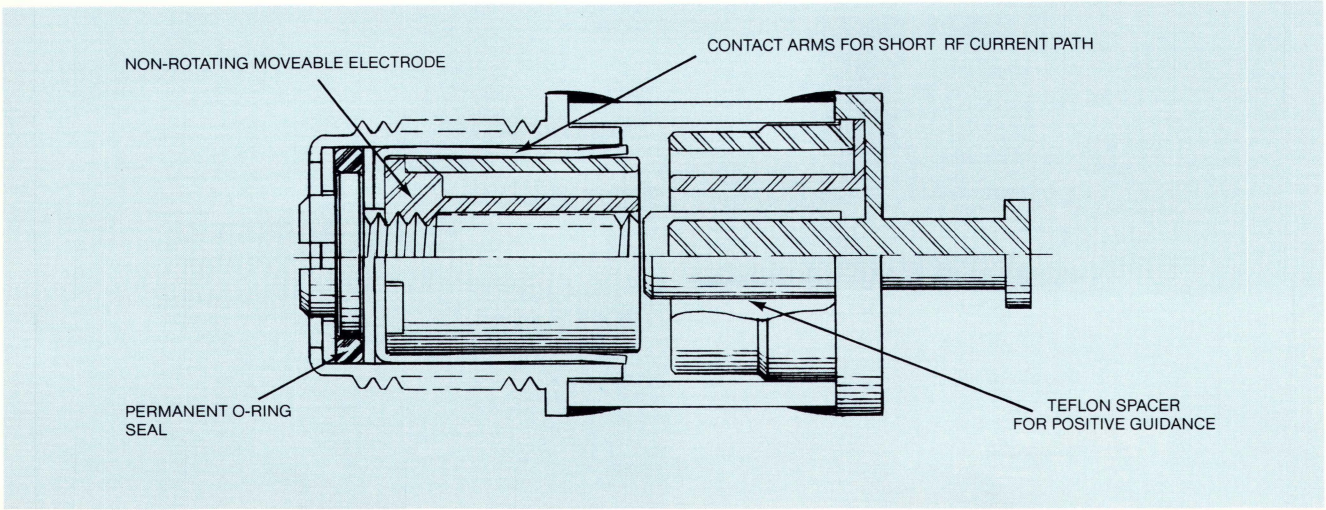
Other features include:

- Ten full linear turns
- Internal stops
- Extreme stability under shock & vibration
- Screw head does not move in and out
- Extended shaft option of metal or plastic
- Long life with no dynamic tuning noise

NOTE:
All parts shown here can be ordered as non-magnetic:
Add "NM" to Part Number, i.e., NMAP10

Available in two styles:

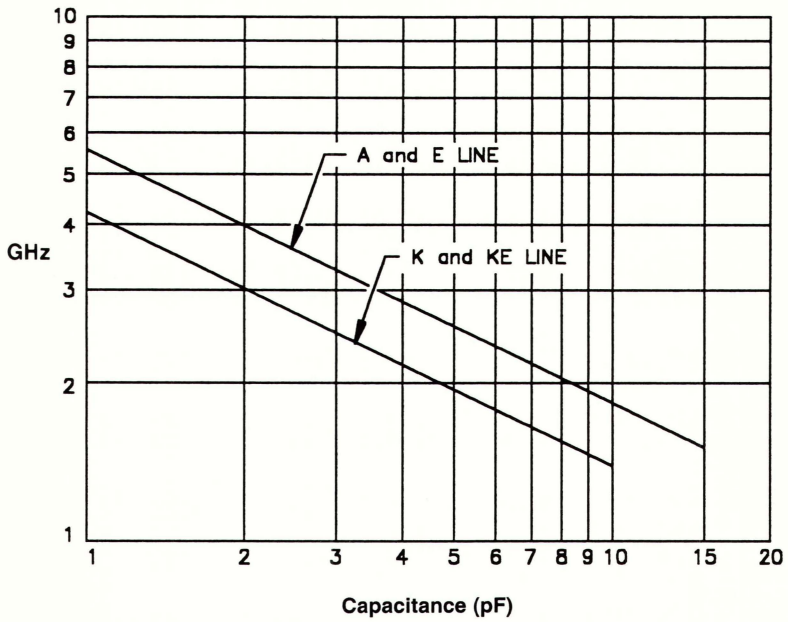
"A" Series - Solder sealed and qualified to MIL-C-14409D.
"K" Series - Solder sealed.
"E" and "KE" Series - Epoxy sealed for economical commercial applications.


NON-ROTATING MOVEABLE ELECTRODE
CONTACT ARMS FOR SHORT RF CURRENT PATH
PERMANENT O-RING SEAL
TEFLON SPACER FOR POSITIVE GUIDANCE

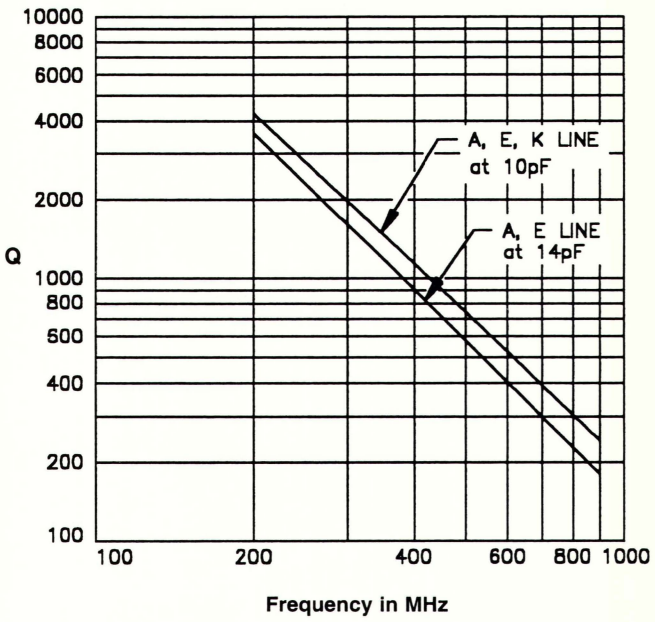
GENERAL SPECIFICATIONS

	"A" SERIES	"E" SERIES	"K" SERIES	"KE" SERIES
Temperature Coefficient	50 ± 50 ppm/°C	−50 ± 50 ppm/°C	50 ± 50 ppm/°C	−50 ± 50 ppm/°C
Insulation Resistance	10^6 megohms	10^6 megohms	10^6 megohms	10^6 megohms
Seal	40 pounds/in²	40 pounds/in²	40 pounds/in²	40 pounds/in²
MIL-C-14409 Qualified	YES	NO	NO	NO
DC Working Voltage	125 (14pF) 250 (5 & 10pF)	125 (14pF) 250 (5 & 10pF)	125 (10pF) 250 (8pF)	125 (10pF) 250 (8pF)
DC Withstanding Voltage	250 (14pF) 500 (5 & 10pF)	250 (14pF) 500 (5 & 10pF)	250 (10pF) 500 (8pF)	250 (10pF) 500 (8pF)
Q at 100 MHz at maximum rated C	3000 (14pF) 5000 (5 & 10pF)	3000 (14pF) 5000 (5 & 10pF)	5000	5000
Operating Temperature	−65°C to+125°C	−65°C to+125°C	−65°C to+125°C	−65°C to+125°C
Rotational Life	10,000 turns	10,000 turns	10,000 turns	10,000 turns
Torque	0.5-5.0 in-oz	0.5-5.0 in-oz	0.5-5.0 in-oz	0.5-5.0 in-oz
Vibration	50g, 10-2000 Hz	50g, 10-2000 Hz	50g, 10-2000 Hz	50g, 10-2000 Hz
Shock	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.
Drawing tolerances where not specified	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016

SELF-RESONANT FREQUENCY



QUALITY FACTOR (Q)



Recommended Tuning Tool: TT-100 or TT-600

"A" & "E" SERIES - Air Trimmer Capacitors

FIG. 1

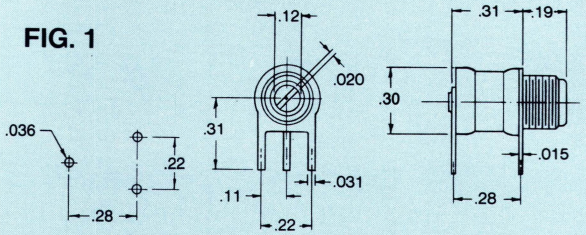


FIG. 2

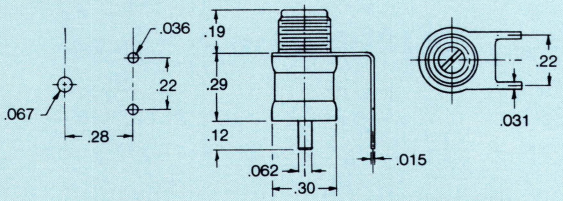


FIG. 3

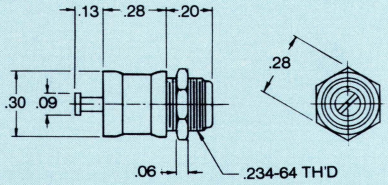


FIG. 4

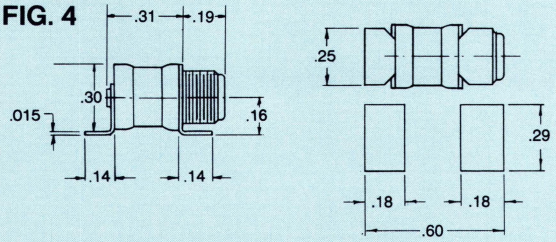
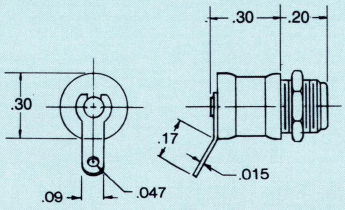
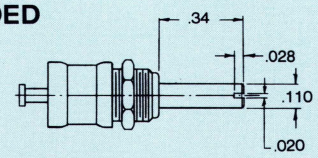


FIG. 5



NOTE: All bushing threads are .234"-64

EXTENDED METAL SHAFT



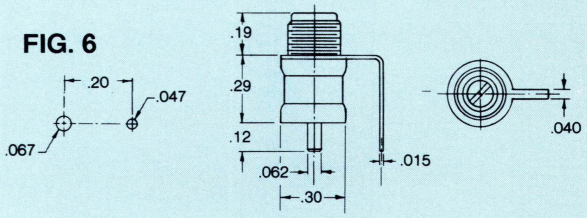
	Part Number	MIL Designation	Capacitance (pF) From Below	Capacitance (pF) To Above
FIG. 1	AP5		1.0	5.0
	AP10	PC18L100	1.0	10.0
	AP14	PC18L140	1.0	14.0
	EP5		0.6	5.0
	EP10		0.6	10.0
	EP14		0.6	14.0
FIG. 2	AF5		1.0	5.0
	AF10	PC19L100	1.0	10.0
	AF14	PC19L140	1.0	14.0
	EF5		0.6	5.0
	EF10		0.6	10.0
	EF14		0.6	14.0
FIG. 3	AT5		1.0	5.0
	AT10	PC47L100	1.0	10.0
	AT14	PC47L140	1.0	14.0
	ET5		0.6	5.0
	ET10		0.6	10.0
	ET14		0.6	14.0
FIG. 4	AJ5		1.0	5.0
	AJ10	PC46L100	1.0	10.0
	AJ14	PC46L140	1.0	14.0
	EJ5		0.6	5.0
	EJ10		0.6	10.0
	EJ14		0.6	14.0
FIG. 5	AT5L		1.0	5.0
	AT10L		1.0	10.0
	AT14L		1.0	14.0
	ET5L		0.6	5.0
	ET10L		0.6	10.0
	ET14L		0.6	14.0

EXTENDED SHAFT OPTIONS

Extended Metal Shaft: Add "E" to Part Number, i.e., AT10E.

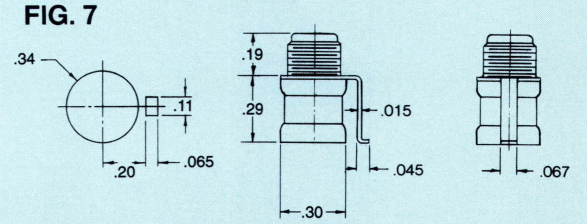
Extended Plastic Shaft: Add "EI" to Part Number, i.e., EF10EI. (Same as metal shaft except .44" by .16" dia.)

FIG. 6



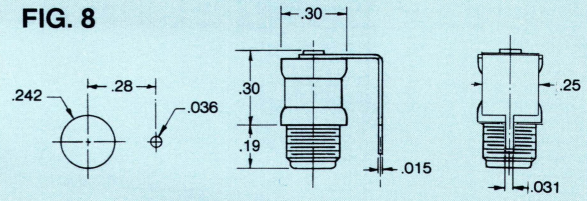
Part Number	Old Part Number	Capacitance (pF) From Below	To Above
AB5		1.0	5.0
AB10	V3116	1.0	10.0
AB14	V3117	1.0	14.0
EB5		0.6	5.0
EB10	V5051	0.6	10.0
EB14	V5105	0.6	14.0

FIG. 7



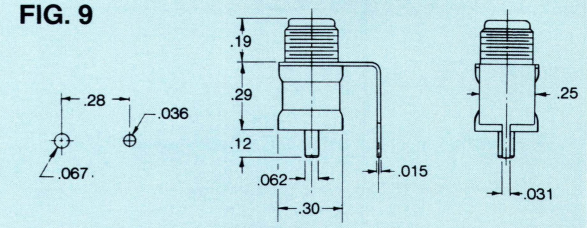
AM5		1.0	5.0
AM10		1.0	10.0
AM14		1.0	14.0
EM5		0.6	5.0
EM10		0.6	10.0
EM14		0.6	14.0

FIG. 8



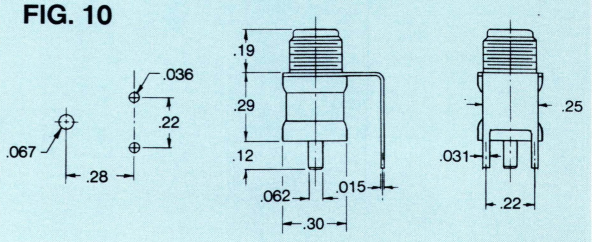
AC5		1.0	5.0
AC10	V3067	1.0	10.0
AC14	V3066	1.0	14.0
EC5		0.6	5.0
EC10	V5086	0.6	10.0
EC14	V5139	0.6	14.0

FIG. 9



AD5		1.0	5.0
AD10	V3168	1.0	10.0
AD14	V3228	1.0	14.0
ED5		0.6	5.0
ED10	V5087	0.6	10.0
ED14	V5143	0.6	14.0

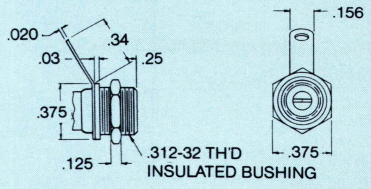
FIG. 10



AE5		1.0	5.0
AE10	V3239	1.0	10.0
AE14	V3193	1.0	14.0
EE5		0.6	5.0
EE10	V5146	0.6	10.0
EE14	V5147	0.6	14.0

INSULATED BUSHING

Insert "I" in Part Number, i.e., AIT10L.



IN	0.015	0.020	0.03	0.031	0.036	0.040	0.047	0.05	0.06	0.062	0.067	0.09
MM	0.38	0.51	0.76	0.79	0.91	1.02	1.19	1.27	1.52	1.57	1.70	2.29
IN	0.11	0.12	0.125	0.13	0.14	0.16	0.17	0.19	0.20	0.22	0.242	0.25
MM	2.79	3.05	3.18	3.30	3.56	4.06	4.32	4.83	5.08	5.59	6.15	6.35
IN	0.28	0.29	0.30	0.31	0.34	0.48						
MM	7.11	7.37	7.62	7.87	8.64	12.19						

"K" & "KE" Series - Air Trimmer Capacitors

FIG. 1

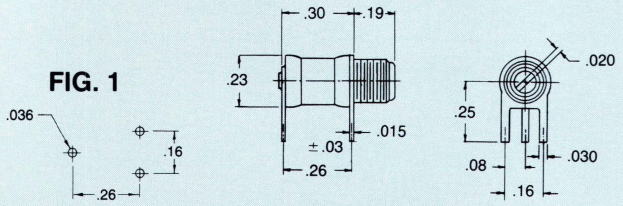


FIG. 2

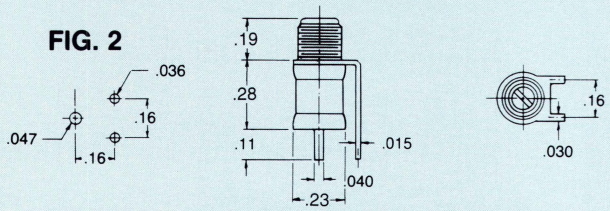


FIG. 3

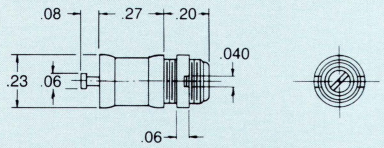


FIG. 4

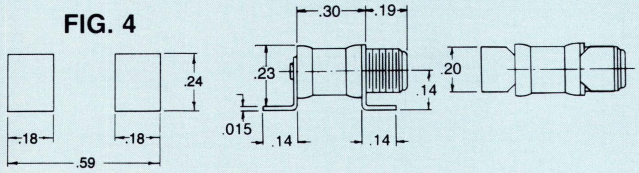


FIG. 5

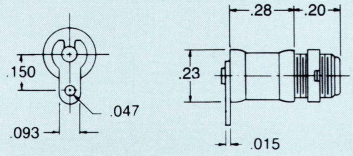


FIG. 6

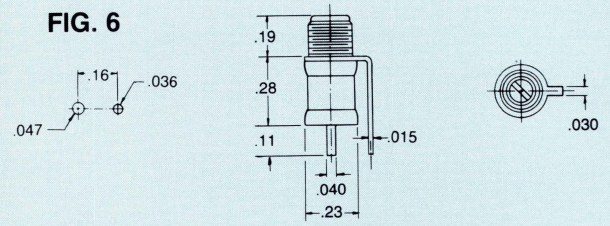
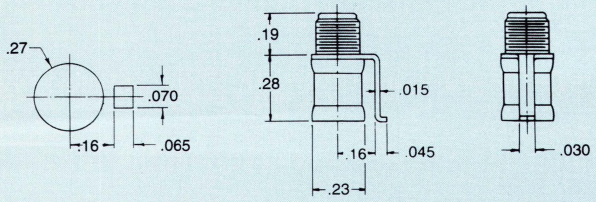


FIG. 7



NOTE: All bushing threads are .190"-64

Part Number		Capacitance (pF)	
"K" Series	"KE" Series	From Below	To Above
FIG. 1			
KP8	KEP8	0.6	8.0
KP10	KEP10	0.6	10.0
FIG. 2			
KF8	KEF8	0.6	8.0
KF10	KEF10	0.6	10.0
FIG. 3			
KT8	KET8	0.6	8.0
KT10	KET10	0.6	10.0
FIG. 4			
KJ8	KEJ8	0.6	8.0
KJ10	KEJ10	0.6	10.0
FIG. 5			
KT8L	KET8L	0.6	8.0
KT10L	KET10L	0.6	10.0
FIG. 6			
KG8	KEG8	0.6	8.0
KG10	KEG10	0.6	10.0
FIG. 7			
KM8	KEM8	0.6	8.0
KM10	KEM10	0.6	10.0

IN	MM	IN	MM	IN	MM
0.015	0.38	0.080	2.03	0.230	5.84
0.030	0.76	0.093	2.36	0.250	6.35
0.036	0.91	0.110	2.79	0.264	6.71
0.040	1.02	0.140	3.56	0.270	6.86
0.045	1.14	0.150	3.81	0.280	7.11
0.060	1.52	0.160	4.06	0.290	7.37
0.067	1.70	0.190	4.83	0.300	7.62
		0.200	5.08	0.470	11.94

Recommended Tuning Tool: TT-100 or TT-500

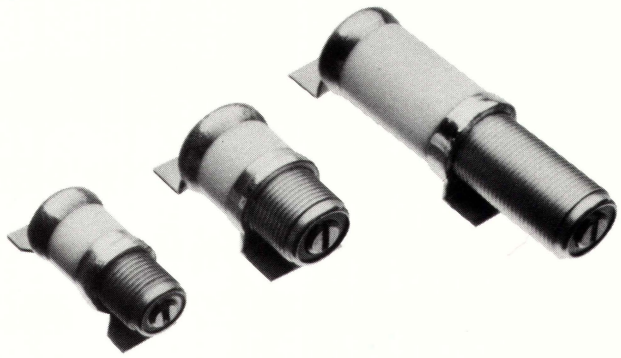
High Voltage Teflon Dielectric Trimmer Capacitors

AVAILABLE IN NON-MAGNETIC VERSIONS

THE ONLY INTERNALLY-SEALED HIGH VOLTAGE TEFLON TRIMMERS

- 1,500 to 2,500 DC withstanding voltage
- 4, 10, 16, 23 and 40 pF maximum capacitance ranges

Voltronics concentric ring teflon dielectric trimmer capacitors are designed for use at frequencies up to 1.5 GHz. They are ideal for HIGH VOLTAGE applications. The solid internal teflon dielectric prevents ionization, a major advantage in space, high altitude and high voltage applications. The unique internal O-ring seal makes wave soldering and vapor degreasing possible without the need to attach a separate cap.



U.S. Patent No. 5,229,911

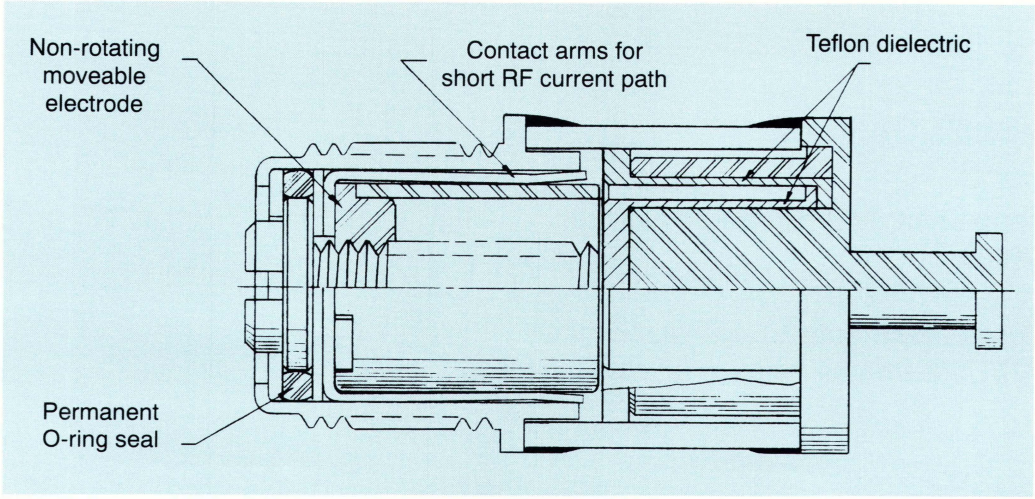
Other features include:

- Ten full linear turns
- Internal stops
- Extreme stability under shock & vibration
- Screw head does not move in and out
- Extended shaft option of metal or plastic
- Long life with no dynamic tuning noise

Available in two styles:

A__HV and K__HV Series – Solder sealed ceramic body

E__HV and KE__HV Series – Epoxy sealed plastic body



TEFLON DIELECTRIC TRIMMER

100-10 FORD ROAD ▪ DENVILLE, NEW JERSEY 07834 ▪ PHONE : 201-586-8585 ▪ FAX : 201-586-3404

Voltronics CORPORATION
The Trimmer Capacitor Company

High Voltage Teflon Dielectric Trimmer Capacitors

GENERAL SPECIFICATIONS

	A__HV SERIES	E__HV SERIES	K__HV SERIES	KE__HV SERIES
Q at 100 MHz at maximum rated C	2,000 (4 & 10pF) 1,500 (16 & 23pF) 1,000 (40pF)	2,000 (4 & 10pF) 1,500 (16 & 23pF)	3,000	3,000
Temperature Coefficient	0 ± 50 ppm/°C 0 ±100 ppm/°C (40pF)	−50 ± 50 ppm/°C	0 ± 50 ppm/°C	−50 ± 50 ppm/°C
Insulation Resistance	10^6 megohms	10^6 megohms	10^6 megohms	10^6 megohms
Seal	40 pounds/in²	40 pounds/in²	40 pounds/in²	40 pounds/in²
Operating Temperature	−65°C to +125°C	−65°C to +125°C	−65°C to +125°C	−65°C to +125°C
Rotational Life	10,000 turns	10,000 turns	10,000 turns	10,000 turns
Torque	0.5-5.0 in-oz	0.5-5.0 in-oz	0.5-5.0 in-oz	0.5-5.0 in-oz
Vibration	50g, 10-2000 Hz	50g, 10-2000 Hz	50g, 10-2000 Hz	50g, 10-2000 Hz
Shock	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.	1500 g, 0.5 millisecs.
Drawing tolerances where not specified	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016	XXX ± .005 XX ± .016

Options

The "SD" Option - for applications requiring high range but lower voltage:

All 23 & 40pF parts may be ordered as standard voltage parts, 250 DC working volts and 500 DC withstanding volts. These are listed next to each figure with a "SD" suffix instead of the "HV".

Non-Magnetic Options:

All parts shown on pages 9, 10, and 11, can be ordered as non-magnetic. Add "NM" to part number, i.e., NMAT25HV, NMKP10HV, NMAJ40HV.

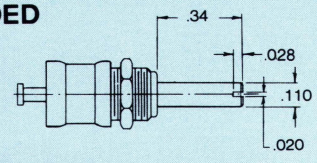
Extended Shaft Options

Extended Metal Shaft: Add "E" to Part Number, i.e., AT10HVE.

Extended Plastic Shaft: Add "EI" to Part Number, i.e., EF10HVEI (Same as metal shaft except .44" by .16").

A__HV AND E__HV OPTIONS

EXTENDED METAL SHAFT



IN	0.015	0.020	0.028	0.03	0.031	0.036	0.040	0.047	0.05	0.06	0.062	0.067	0.09	0.11	0.12	0.125	0.13	0.14	0.16	0.17	0.19	0.20	0.22	0.242	0.25	0.28	0.29
MM	0.38	0.51	0 71	0.76	0.79	0.91	1.02	1.19	1.27	1.52	1.57	1.70	2.29	2.79	3.05	3.18	3.30	3.56	4.06	4.32	4.83	5.08	5.59	6.15	6.35	7.11	7.37
IN	0.30	0.31	0.34	0.48																							
MM	7.62	7.87	8.64	12.19																							

A_HV & E_HV SERIES Teflon Dielectric Trimmer Capacitors

FIG. 1

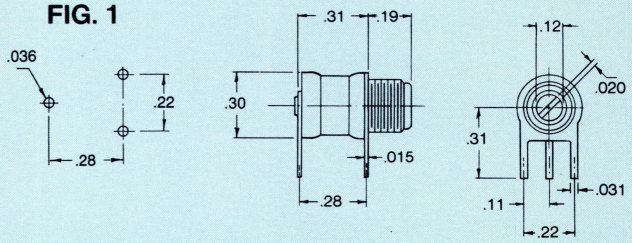


FIG. 2

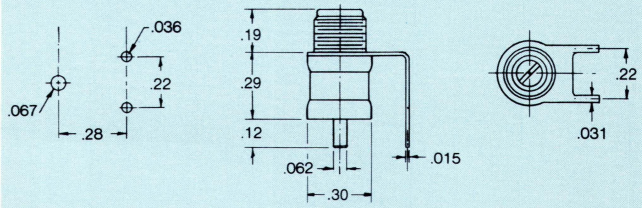


FIG. 3

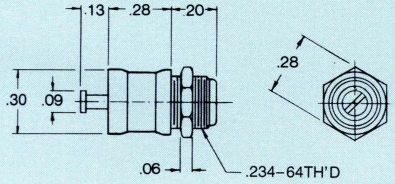


FIG. 4

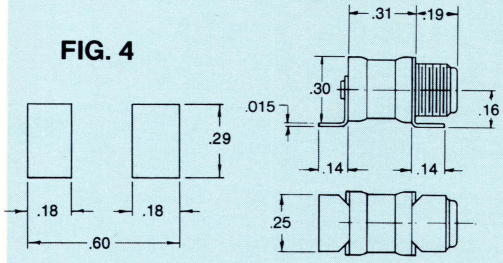
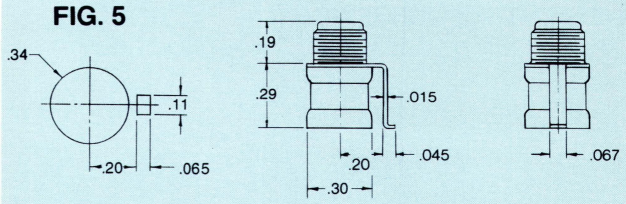


FIG. 5



NOTE: All bushing threads are .234"-64

	Part Number		DC Working Voltage	DC Withstanding Voltage	Capacitance (pF)	
	"A" Series	"E" Series			From Below	To Above
FIG. 1	AP4HV	EP4HV	1000	2000	1.0	4.0
	AP10HV	EP10HV	1000	2000	1.0	10.0
	AP15HV	EP15HV	1000	2000	1.0	16.0
	AP25HV	EP25HV	750	1500	1.0	23.0
	AP25SD	EP25SD	250	500	1.0	23.0
FIG. 2	AF4HV	EF4HV	1000	2000	1.0	4.0
	AF10HV	EF10HV	1000	2000	1.0	10.0
	AF15HV	EF15HV	1000	2000	1.0	16.0
	AF25HV	EF25HV	750	1500	1.0	23.0
	AF25SD	EF25SD	250	500	1.0	23.0
FIG. 3	AT4HV	ET4HV	1000	2000	1.0	4.0
	AT10HV	ET10HV	1000	2000	1.0	10.0
	AT15HV	ET15HV	1000	2000	1.0	16.0
	AT25HV	ET25HV	750	1500	1.0	23.0
	AT25SD	ET25SD	250	500	1.0	23.0
FIG. 4	AJ4HV	EJ4HV	1000	2000	1.0	4.0
	AJ10HV	EJ10HV	1000	2000	1.0	10.0
	AJ15HV	EJ15HV	1000	2000	1.0	16.0
	AJ25HV	EJ25HV	750	1500	1.0	23.0
	AJ25SD	EJ25SD	250	500	1.0	23.0
FIG. 5	AM4HV	EM4HV	1000	2000	1.0	4.0
	AM10HV	EM10HV	1000	2000	1.0	10.0
	AM15HV	EM15HV	1000	2000	1.0	16.0
	AM25HV	EM25HV	750	1500	1.0	23.0
	AM25SD	EM25SD	250	500	1.0	23.0

Recommended Tuning Tool: TT-100 or TT500

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Voltronics CORPORATION
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K_HV & KE_HV SERIES Teflon Dielectric Trimmer Capacitors

FIG. 1

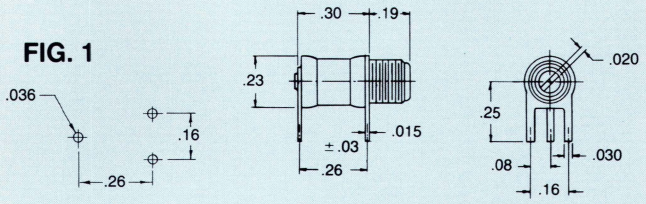


FIG. 2

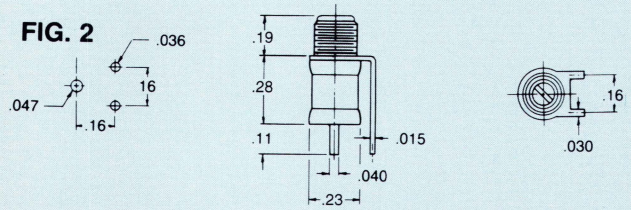


FIG. 3

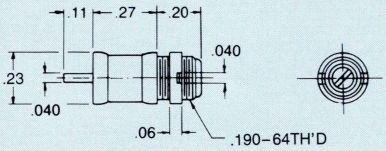


FIG. 4

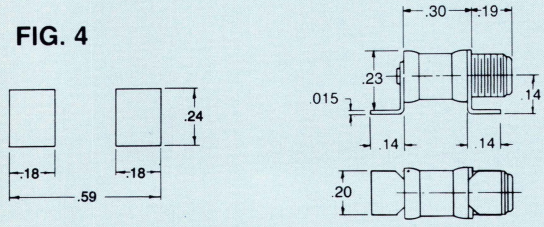
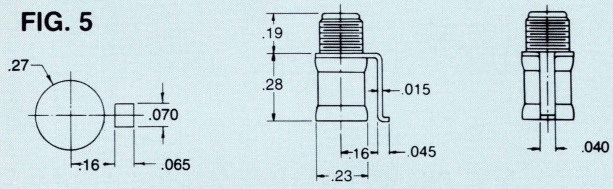
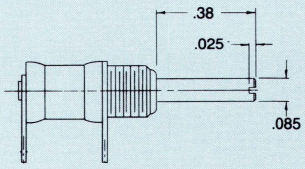


FIG. 5



EXTENDED METAL SHAFT



	Part Number		DC Working Voltage	DC Withstanding Voltage	Capacitance (pF)	
	"K" Series	"KE" Series			From Below	To Above
FIG. 1	KP10HV	KEP10HV	1000	2000	1.0	9.0
FIG. 2	KF10HV	KEF10HV	1000	2000	1.0	9.0
FIG. 3	KT10HV	KET10HV	1000	2000	1.0	9.0
FIG. 4	KJ10HV	KEJ10HV	1000	2000	1.0	9.0
FIG. 5	KM10HV	KEM10HV	1000	2000	1.0	9.0

NOTE: All bushing threads are .190"-64

Recommended Tuning Tool: TT-100 or TT500

EXTENDED SHAFT OPTION

Extended Metal Shaft: Add "E" to Part Number, i.e., KP10HVE.

IN	0.015	0.025	0.030	0.036	0.040	0.045	0.060	0.067	0.080	0.085	0.093	0.110	0.140	0.150	0.160	0.190	0.200	0.230	0.250	0.264	0.270	0.280
MM	0.38	0.63	0.76	0.91	1.02	1.14	1.52	1.70	2.03	2.16	2.36	2.79	3.56	3.81	4.06	4.83	5.08	5.84	6.35	6.71	6.86	7.11

IN	0.290	0.300	0.380	0.470
MM	7.37	7.62	9.65	11.94

A_40HV & A_40SD Series - 40pF Teflon Dielectric Trimmer Capacitors

U.S. Patent Number 5,229,911

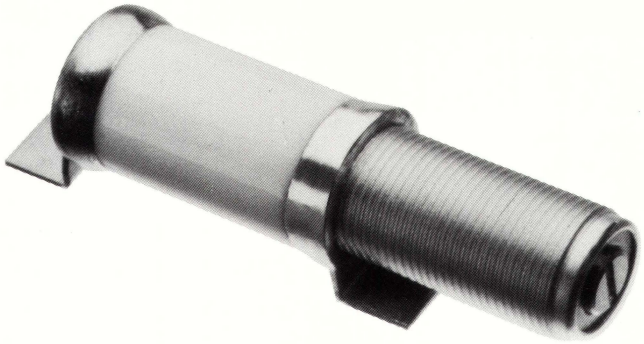


FIG. 1

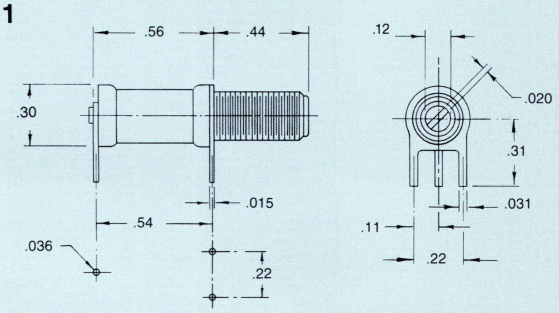


FIG. 2

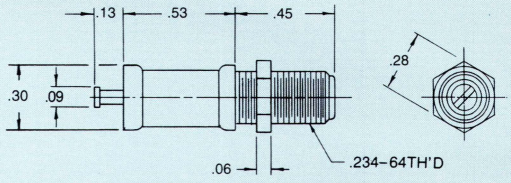
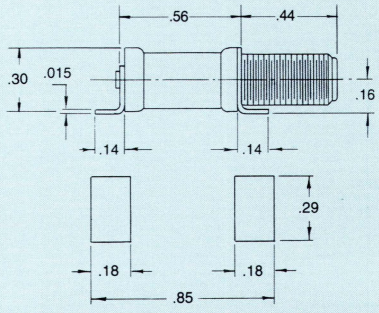
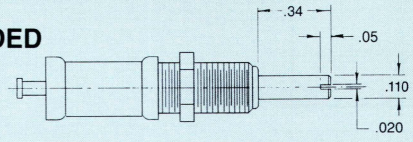


FIG. 3



EXTENDED METAL SHAFT



Part Number	DC Working Voltage	DC Withstanding Voltage	Capacitance (pF)	
			From Below	To Above
FIG. 1				
AP40HV	1000	2000	1.5	40.0
AP40SD	250	500	1.5	40.0
FIG. 2				
AT40HV	1000	2000	1.5	40.0
AT40SD	250	500	1.5	40.0
FIG. 3				
AJ40HV	1000	2000	1.5	40.0
AJ40SD	250	500	1.5	40.0

Recommended Tuning Tool: TT-100 or TT-600

NOTE: All bushing threads are .234"-64

EXTENDED SHAFT OPTION

Extended Metal Shaft: Add "E" to Part Number, i.e., AT40SDE

IN	0.015	0.020	0.031	0.036	0.050	0.060	0.090	0.110	0.120	0.130	0.140	0.160	0.180	0.220	0.250	0.280	0.290	0.300	0.310	0.340	0.440	0.450	0.530	0.540	0.560	0.850
MM	0.38	0.51	0.79	0.91	1.27	1.52	2.29	2.79	3.05	3.30	3.56	4.06	4.57	5.59	6.35	7.11	7.37	7.62	7.87	8.64	11.18	11.43	13.46	13.72	14.22	21.59

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Voltronics CORPORATION
The Trimmer Capacitor Company

"P" SERIES - Sealed Sapphire Trimmer Capacitors

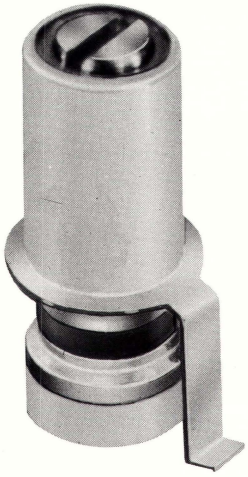
Voltronics "P" line of sapphire subminiature trimmer capacitors is a unique design.

The trimmers have high Q, zero temperature coefficient, and are internally O-ring sealed to keep out flux and cleaning fluid. Yet, sizes are the same as the MIL unsealed styles. The tuning screw does not move in and out, and RF current does not run along it.

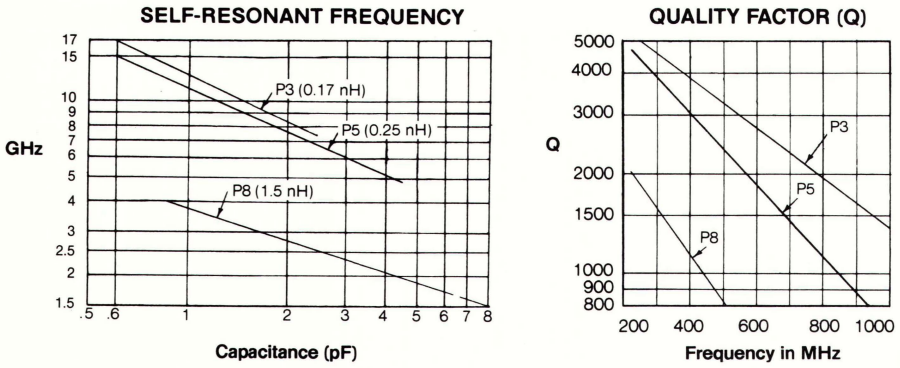
Sapphire is ideal for precision trimmer capacitors. Its dielectric constant does not change with frequency, and its loss constant is extremely stable, measuring below 0.0003 up to 10 GHz. Sapphire is chemically inert, totally moisture resistant, and mechanically strong.

THE "P" LINE OFFERS:

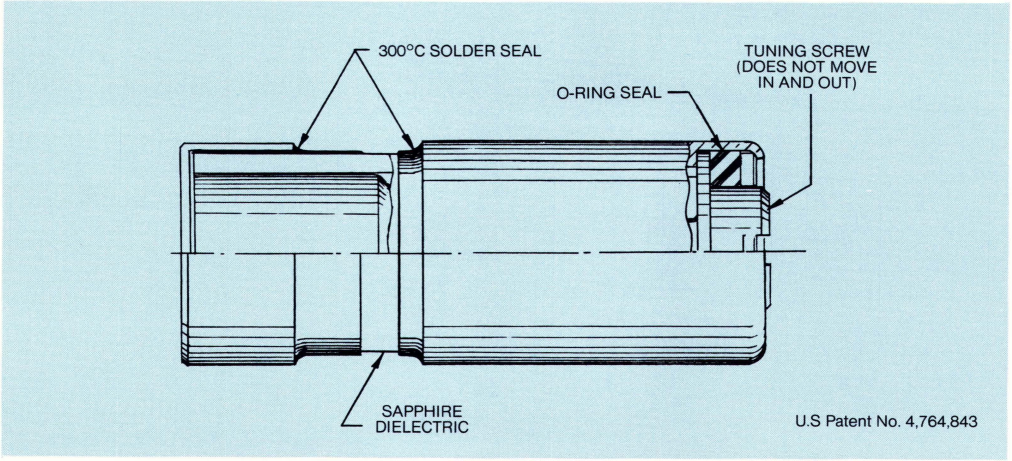
- High Q, low temperature coefficient, and internal seal
- Low self-inductance for use to 10 GHz
- Interchangeability with unsealed designs
- Long life, no measurable tuning noise



HIGH FREQUENCY DATA*



*This high frequency data was taken on a Boonton Model 34A Resonant Coaxial-line with the parts set at their maximum rated capacitance values. Connections to the parts were made directly on the body of the capacitors.

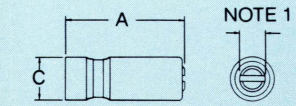


GENERAL SPECIFICATIONS

- D.C. Working Voltage: 500
- D.C. Withstanding Voltage: 1000
- Seal: Internal O-ring
- Operating Temperature: -55°C to +125°C
- Mechanical Shock: 100 g's 6 ms
- Vibration: 60 g's, 10-2000 Hz
- Tuning Torque: 0.2 to 2.0 inch ounces
- Temperature Coefficient: 0 ± 50 ppm/°C (0 ± 75 ppm/°C on P8 size)
- Insulation Resistance: 10^5 megohms

Recommended Tuning Tool: TT-100

FIG. 1



Note 1: Slot is .018 deep x .015 wide x .075 long.

FIG. 2

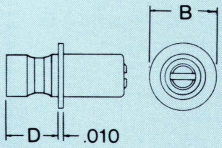


FIG. 3

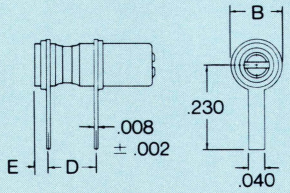


FIG. 4

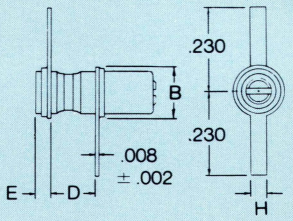


FIG. 5

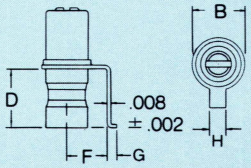


FIG. 6

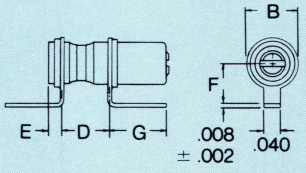
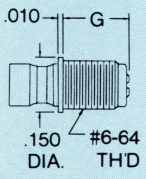
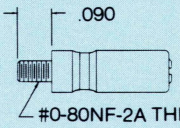


FIG. 7



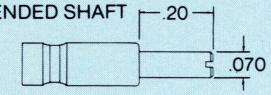
Optional Configurations

STUD MOUNT



ADD "N" TO TYPE DESIGNATION (EX. P5N)

EXTENDED SHAFT



ADD "E" TO TYPE DESIGNATION (EX. P8AE)

IN	0.002	0.005	0.008	0.010	0.014	0.015	0.018	0.020	0.025	0.034	0.036	0.040	0.045	0.047	0.056	0.060	0.070	0.075	0.082	0.090	0.093	0.094	0.100	0.110	0.118	0.125	0.130	0.140	0.148	0.150	0.160	0.183	0.190	0.230	0.240	0.245	0.250	0.329	0.495
MM	0.05	0.13	0.20	0.25	0.36	0.38	0.46	0.51	0.64	0.86	0.91	1.02	1.14	1.19	1.42	1.52	1.78	1.91	2.08	2.29	2.36	2.39	2.54	2.79	3.00	3.18	3.30	3.56	3.76	3.81	4.06	4.65	4.83	5.84	6.10	6.22	6.35	8.36	12.57

Type	Fig.	Capacitance Range (pF) From Below	Capacitance Range (pF) To Above	Q (Min.) 250 MHz	Tolerances (where not specified) ±.016 A (max)	B DIA.	C± .005	D± .010	E± .010	F	G	H± .005
P3A	1	0.6	2.5	4,000	.240	—	.118	—	—	—	—	—
P5A	1	0.6	4.5	3,000	.329	—	.118	—	—	—	—	—
P8A	1	0.8	8.0	1,500	.495	—	.118	—	—	—	—	—
P3D	2	0.6	2.5	4,000	.240	.190	.118	.100	—	—	—	—
P5D	2	0.6	4.5	3,000	.329	.190	.118	.150	—	—	—	—
P8D	2	0.8	8.0	1,500	.495	.190	.118	.230	—	—	—	—
P3B	3	0.6	2.5	4,000	.240	.140	.118	.082	.014	—	—	—
P5B	3	0.6	4.5	3,000	.329	.140	.118	.130	.034	—	—	—
P8B	3	0.8	8.0	1,500	.495	.140	.118	.250	.036	—	—	—
P3C	4	0.6	2.5	4,000	.240	.140	.118	.056	.018	—	—	.093
P5C	4	0.6	4.5	3,000	.329	.140	.118	.060	.060	—	—	.093
P8C	4	0.8	8.0	1,500	.495	.140	.118	.050	.148	—	—	.093
P3F	5	0.6	2.5	4,000	.240	.140	.118	.090	—	.110	.025	.04
V6064	5	0.6	2.5	4,000	.240	.140	.118	.090	—	.110	.025	.09
V6034	5	0.6	4.5	3,000	.329	.140	.118	.160	—	.110	.025	.09
V6047	5	0.6	4.5	3,000	.329	.140	.118	.160	—	.140	.100	.04
P5F	5	0.6	4.5	3,000	.329	.140	.118	.160	—	.110	.025	.04
P8F	5	0.8	8.0	1,500	.495	.140	.118	.250	—	.110	.025	.04
P3J	6	0.6	2.5	4,000	.240	.140	.118	.082	.014	.070	.160	—
P5J	6	0.6	4.5	3,000	.329	.140	.118	.130	.034	.070	.160	—
P8J	6	0.8	8.0	1,500	.495	.140	.118	.250	.036	.070	.160	—
P3M	7	0.6	2.5	4,000	.240	—	.118	—	—	—	.125	—
P5M	7	0.6	4.5	3,000	.329	—	.118	—	—	—	.160	—
P8M	7	0.8	8.0	1,500	.495	—	.118	—	—	—	.230	—

NOTE: For diameter and length dimensions on figures 2-7, see figure 1.

100-10 FORD ROAD ▪ DENVILLE, NEW JERSEY 07834 ▪ PHONE : 201-586-8585 ▪ FAX : 201-586-3404

Voltronics CORPORATION
The Trimmer Capacitor Company

Non-magnetic Trimmer Capacitors

Voltronics Corporation has produced non-magnetic trimmer capacitors for over 25 years. The increasing applications have impelled the company to mount an active, continuing engineering effort in this field.

NON-MAGNETIC PROPERTIES

The severe requirement for non-magnetic properties is such that in a 14,000 Gauss field the capacitors must not distort the useable field by more than one part per 600 million. To achieve this, no materials or platings exhibiting measureable magnetism, such as stainless steel or nickel, are used. Commercial brass is unacceptable. Typical magnetic susceptibility is 40 x 10^{-6} CGS units. Voltronics' strict traceability system and its testing for minute magnetism insure this essential parameter.

NON-ROTATING PISTON TRIMMER DESIGN

The capacitors have Voltronics' unique non-rotating piston design which offers 100% tuning linearity without reversals, high Q, long life, and low internal inductance. The internal bushing arms which prevent rotation also wipe on the moving piston to form a low resistance contact which can carry several amperes of RF current. **No current flows along the tuning screw as in all other trimmer capacitor designs!**

SEAL

Most of the capacitors are internally O-ring sealed so that they can withstand immersion in flux and cleaning solvents without leaking.

DIELECTRIC

There are six choices of dielectric material: annular band glass, embedded band glass, quartz, air, teflon and sapphire. Annular band glass consists of a tube of glass with metallized bands on the outside. Embedded band glass is the same as annular band with a metallic electrode embedded inside to decrease the effective dielectric thickness and thus increase capacitance. This also lowers the voltage rating. Quartz has a high voltage rating and has high Q. Sapphire's high dielectric constant combined with a high Q and voltage rating make it the best overall dielectric, but also the most expensive. Teflon has the highest voltage rating and high Q, but has a lower dielectric constant which results in lower capacitance ranges or larger sizes. Air offers high Q, small size and no organic material, a factor in some NMR tests. The parts on pages 9, 10 and 11 with teflon offer small size, high voltage ratings and no internal air gap preventing ionization.

SPLIT STATOR AND DIFFERENTIAL STYLES

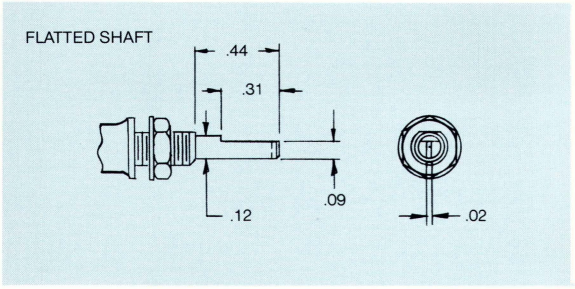
Non-magnetic versions of the parts shown on page 30 are available. Consult the factory for detailed specifications.

SPECIAL DESIGNS

Each of the parts shown in this catalog was developed for a specific customer application. Special parts have been designed for cryogenic applications. Many other mounting configurations are available. Call the factory to discuss your special needs.

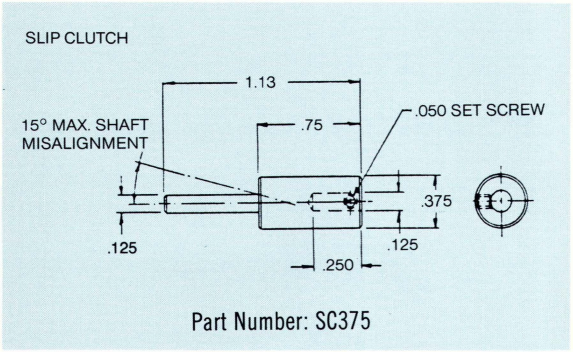
FLATTED SHAFT OPTION

All extended shafts are available with flatted extended shafts as shown in this drawing. To order this option, add "FS" to the part number shown in the second or fourth columns in the "Part Number Designation" section on page 17 (ex. V2010FS).



NON-MAGNETIC SLIP CLUTCH

The slip clutch prevents damage to the trimmer capacitor, especially when it is tuned by a long rod as in many probes. The trimmers' 72 turns per inch internal thread can create great forces on the positive stops which may damage the capacitors or strip the threads. The slip clutch is also able to compensate for up to 15° of misalignment between the rod and the trimmer. The clutch is pre-set to five inch ounces. All parts of the clutch are non-magnetic.



Part Number: SC375

GENERAL SPECIFICATIONS OF PAGE 22 APPLY EXCEPT:

1. Tuning torque: 0.5 to 4 inch ounces
2. Temperature coefficient: -100 to +500 ppm/°C except

NMKP10E:	50 ± 50 ppm/°C
NMKP10HVE:	-60 to +30 ppm/°C
NMAJ25HV:	0 ± 50 ppm/°C
NMAJ40HV:	0 ± 100 ppm/°C

RECOMMENDED TUNING TOOLS:

Voltronics TT-500 and TT-600 tuning tools shown on page 33 are non-magnetic, with ceramic tips.

Non-magnetic Trimmer Capacitors

Capacitance (pF) From Below	Capacitance (pF) To Above	Q (Min.) 25 MHz	Q (Min.) 100 MHz	Peak RF Voltage Rating* 100 MHz	Dielectric	Figure	"A" Dim. ±.06	"B" Dim. ±.03
0.5	3.5	9000	2700	800	Quartz	2	0.63	0.31
1.0	6.0	9000	2000	800	Quartz	2	0.63	0.31
0.8	7.0	9000	3000	500	Sapphire	3	0.50	0.15
1.0	9.0	10000	3000	1500	Teflon	6	0.29	0.23
0.8	10.0	9000	1100	1000	Quartz	5	1.21	0.38
1.0	10.0	2000	1000	6000	Teflon	4	1.15	0.38
2.0	10.0	1800	900	12000	Teflon	4	1.83	0.63
1.0	10.0	3500	900	3000	Teflon	2	1.69	0.31
1.0	10.0	3500	900	4200 (Note 1)	Teflon	2	1.69	0.31
1.0	10.0	10000	5000	250	Air (Note 4)	6	0.29	0.23
1.0	12.0	9000	1000	1200	Quartz	5	1.45	0.45
1.0	15.0	2000	800	4000	Teflon	2	1.69	0.31
1.0	22.0	9000	800	900	Quartz	2	1.67	0.31
1.0	23.0	8000	2000	1100	Teflon	1 (Note 2)	0.31	0.19
7.5	24.0	7000	800	1000	Quartz	5	1.48	0.40
5.0	25.0	2000	750	6000	Teflon	4	1.62	0.63
7.0	25.0	1500	700	15000	Teflon	4	1.77	1.13
4.0	30.0	1200	600	6000	Teflon	4	2.25	1.50
1.0	38.0	800	250	900	Glass	7	1.67	0.31
1.0	38.0	800	250	900	Glass	2	1.67	0.31
1.5	40.0	5000	1000	1500	Teflon	1 (Note 2)	0.56	0.44
2.0	40.0	3000	400	700	Sapphire	2	1.30	0.31
5.0	50.0	700	350	10000	Teflon	4	2.25	1.50
2.5	70.0	650	325	6000	Teflon	4	3.00	0.70
6.5	70.0	650	325	15000	Teflon	4	3.25	1.63
5.0	85.0	600	300	6000	Teflon	4	3.25	1.50
2.0	120.0	600	95	700	Glass	8	1.76	0.31

IN	0.010	0.015	0.016	0.020	0.025	0.030	0.036	0.040	0.070	0.080	0.085	0.090	0.095	0.120	0.150	0.160	0.167	0.190	0.200	0.220	0.225	0.230	0.235	0.240	0.245	0.250	0.260	0.281
MM	0.25	0.38	0.41	0.51	0.64	0.76	0.91	1.02	1.78	2.03	2.16	2.29	2.41	3.05	3.81	4.06	4.24	4.83	5.08	5.59	5.72	5.84	5.97	6.10	6.22	6.35	6.60	7.14

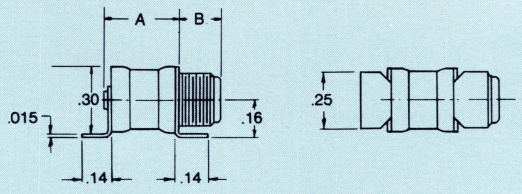


FIG. 1

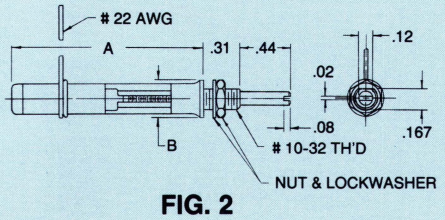


FIG. 2

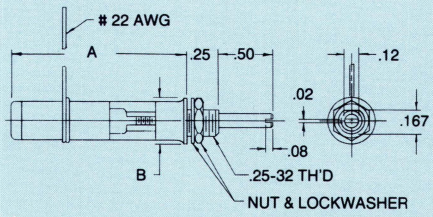


FIG. 5

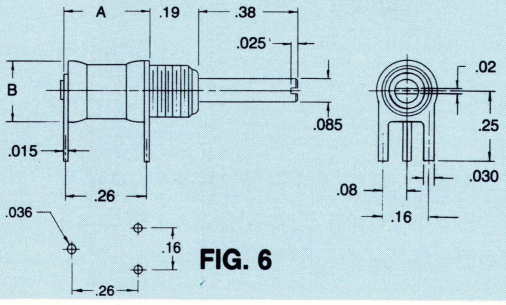


FIG. 6

PART NUMBER DESIGNATIONS			
Configuration as shown on drawing	Same as drawing without extended shaft (Note 3)	Same as drawing with no lead(s)	Same as drawing with no lead(s) and no extended shaft
NMQM3GE	NMQM3G	V2105	NMQM3GNL
NMQM6GE	NMQM6G	NMQM6GENL	NMQM6GNL
NMP8ME	NMP8M	N/A	N/A
NMKP10HVE	NMKP10HV	NMKP10HVENL	NMKP10HVNL
V2236	V2010	V2102	V2276
NMNT10-6E	NMNT10-6	NMNT10-6ENL	NMNT10-6NL
NMNT10-12E	NMNT10-12	NMNT10-12ENL	NMNT10-12NL
V2145E	V2145D	V2145B	V2145F
V2145H	V2145G	V2145A	V2145I
NMKP10E	NMKP10	NMKP10ENL	NMKP10NL
V2269	V2268	V2002B	V2002A
NMNT15E	NMNT15	NMNT15ENL	NMNT15NL
NMQM22GE	NMQM22G	NMQM22GENL	NMQM22GNL
NMAJ25HVE	NMAJ25HV	NMAJ25HVENL	NMAJ25HVNL
V2271	V2270	V2101	V2272
NMNT25-6E	NMNT25-6	NMNT25-6ENL	NMNT25-6NL
NMNT25-15E	NMNT25-15	NMNT25-15ENL	NMNT25-15NL
NMNT30E	NMNT30	NMNT30ENL	NMNT30NL
V2066E	V2066	N/A	N/A
NMTM38GE	NMTM38G	NMTM38GENL	NMTM38GNL
NMAJ40HVE	NMAJ40HV	NMAJ40HVENL	NMAJ40HVNL
V2274	V2273	V2050	V2275
NMNT50E	NMNT50	NMNT50ENL	NMNT50NL
NMNT70-6E	NMNT70-6	NMNT70-6ENL	NMNT70-6NL
NMNT70-15E	NMNT70-15	NMNT70-15ENL	NMNT70-15NL
NMNT85E	NMNT85	NMNT85ENL	NMNT85NL
NMTM120CE	NMTM120C	N/A	N/A

NOTES:

1. V2145H type parts are filled with silicone fluid to increase RF breakdown voltage.
2. NMAJ25HV and NMAJ40HV can be ordered with additional lead configurations. See pages 9 and 11.
3. For parts without extended shafts, the tuning screw will either be recessed inside the threaded bushing or will be flush with the end of the bushing.
4. All air dielectric trimmer capacitors on pages 4, 5 & 6 can be ordered non-magnetic.

*RF VOLTAGE RATINGS:

Because RF non-magnetic applications are pulsed, only RF pulse peak voltage ratings are listed. These are the voltages at which arcing began inside the parts. The parts were not damaged and continued to be used at slightly lower power settings. CW ratings are lower. DC ratings are substantially higher. Almost every application is different, with pulse rate, frequency and impedance varying. For substantially higher voltage ratings, consult the factory. Modifications may be possible to meet your requirements.

The RF peak voltage ratings are shown as a guide only. They are based upon a limited number of tests by an NMR lab. Voltronics does not perform these tests as part of the normal final inspection procedures.

0	.300	.310	.380	.440	.450	.460	.500	.560	.630	.700	1.000	1.130	1.150	1.210	1.300	1.380	1.450	1.480	1.500	1.620	1.630	1.670	1.690	1.760	1.770	1.830	2.250	3.000	3.250
	7.62	7.87	9.65	11.18	11.43	11.68	12.70	14.22	16.00	17.78	25.40	28.70	29.21	30.73	33.02	35.05	36.83	37.59	38.10	41.15	41.40	42.42	42.93	44.70	44.96	46.48	57.15	76.20	82.55

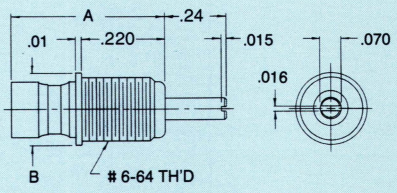


FIG. 3

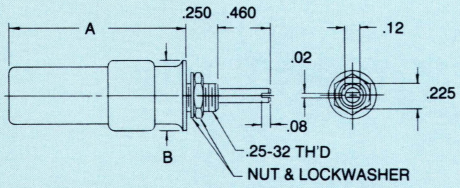


FIG. 4

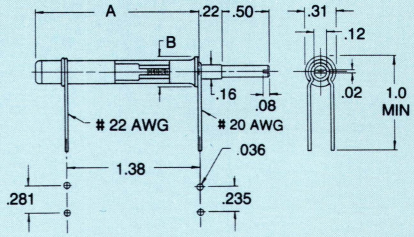


FIG. 7

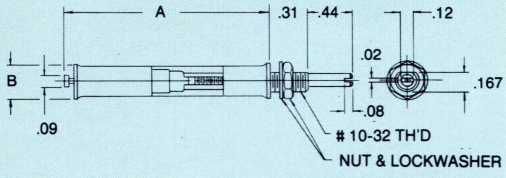


FIG. 8

Precision Microwave Tuners for Dielectric Resonator

These precise tuners provide fine, stable adjustments to microwave components such as cavities, DRO's, wave guides and filters. Applications as diverse as space telemetry to supermarket door openers use these products. The self-locking slots in the threads together with the fine pitch provide reliable permanent settings. They eliminate the loose fits and low resolution of standard threads. Tuning is smooth with controlled torque and no noise.

Bushings, rotors and dielectric rods may be purchased separately.

The DRO tuners are sealed either with an O-ring or by a true hermetic solder seal. The many versions of screw tuners are either entirely metallic or with dielectric rods of sapphire, alumina, or quartz.

THE LINE IS EXPANDING WITH NEW PARTS ADDED CONTINUALLY. IF YOU CAN'T FIND THE PERFECT PART FOR YOUR APPLICATION, CALL US AND WE WILL DESIGN IT.

SELECTION GUIDE		
Style	**Designation**	**Page**
DRO tuners	D & DK	19
DRO hermetically sealed tuners	D-HS	19
Metallic tuning elements	MT	20
Metallic rotors	MR	20
Dielectric tuning elements	DT	21
Dielectric rotors	DR	21
LC tuning elements	LCT	21
Tuning Element Taps	VT	18

TUNING ELEMENT TAPS

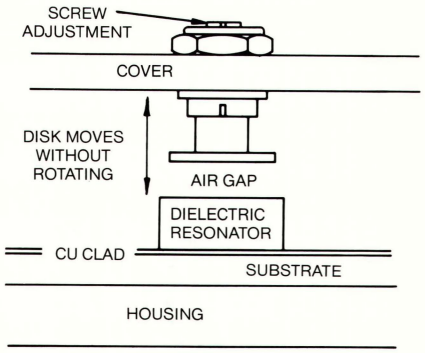
Voltronics offers fluted taps for each part because the thread sizes are fine and non-standard.

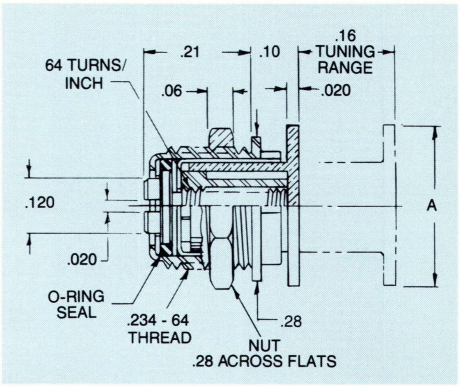
Part Number	Thread Size	For Series	Hole Size
VT-0	1.7MM-0.2MM	DR067	.0591
VT-1	.094-80	MR094, MT067	.0827
VT-2	.120-80	MT094	.1078
VT-3	.156-64	MR156, V7119	.1400
VT-4	.190-64	MT156, MR190, DR190, DK1A	.1747
VT-5	.234-64	MT190, DT190, D1A, D1AHS	.2187
VT-6	.250-64	LCT-1, LCT-2	.2347

Oscillators and Microwave Cavities

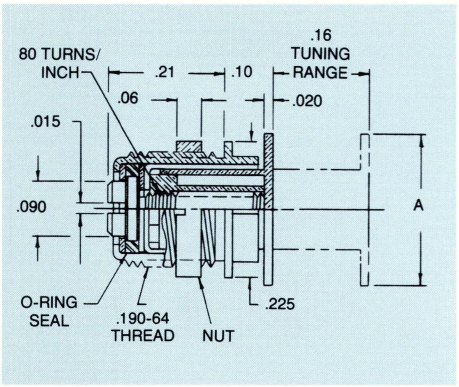
DRO TUNERS

The Voltronics DRO Tuner design is based upon the proven tuning mechanisms of its trimmer capacitors. The parts have O-ring sealed front ends, long life, positive stops and low loss. The tuners have up to 10 full turns of resolution. The disk diameter ("A" Dim.) can be modified to meet your requirements. The hermetically sealed parts have high temperature solder joints. When soldered into your case, there is a hermetic barrier to the inside of your cavity. The part's O-ring seal keeps moisture and other contaminants from getting inside the tuner.



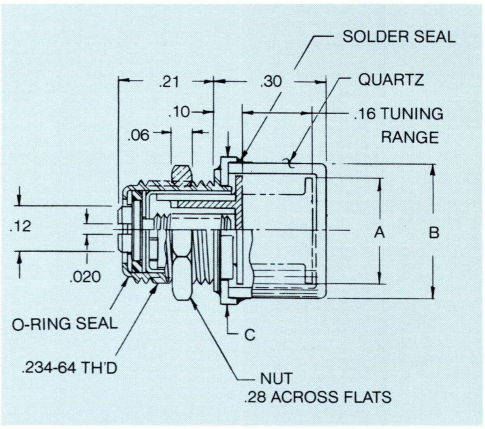


Part No.	A
D1A15	.168
D1A20	.20
D1A25	.25
D1A30	.30
D1A35	.35
D1A63	.63

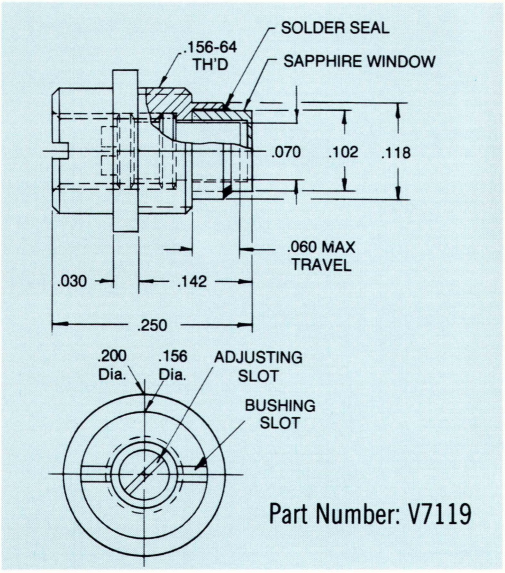


Part No.	A
DK1A15	.15
DK1A20	.20
DK1A25	.25
DK1A30	.30

HERMETICALLY SEALED DRO TUNERS



Part No.	A	B	C
D1A15HS	.150	.275	.306
D1A20HS	.200	.315	.345
D1A25HS	.250	.354	.385
D1A50HS	.500	.610	.640



NEW DESIGNS

Voltronics continues to develop new products for microwave tuning. Sizes and materials can be modified on most of the parts shown here. Call the factory with your requirements.

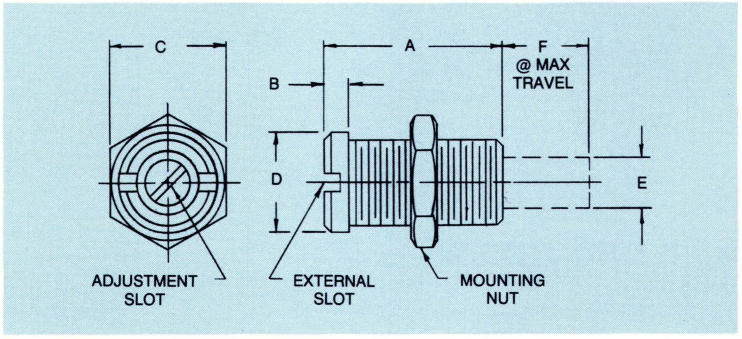
IN	0.015	0.020	0.030	0.060	0.062	0.070	0.083	0.090	0.100	0.102	0.108	0.118	0.120	0.140	0.142	0.150
MM	0.38	0.51	0.76	1.52	1.57	1.78	2.10	2.29	2.54	2.59	2.74	3.00	3.05	3.56	3.61	3.81
IN	0.156	0.160	0.168	0.175	0.190	0.200	0.210	0.219	0.225	0.234	0.235	0.250	0.275	0.280	0.300	0.306
MM	3.96	4.06	4.27	4.44	4.83	5.08	5.33	5.55	5.72	5.94	5.96	6.35	6.99	7.11	7.62	7.77
IN	0.315	0.345	0.350	0.354	0.385	0.500	0.610	0.630	0.640							
MM	8.00	8.76	8.89	8.99	9.78	12.70	15.49	16.00	16.26							

Precision Microwave Tuners

METALLIC TUNING ELEMENTS

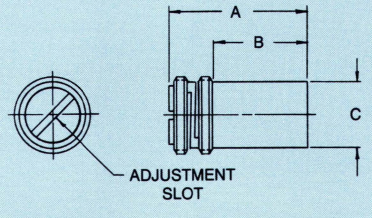
Part Number	A	B	C	D	E	F	Thread UNS-2
MT067-1*	0.145	—	0.114	—	0.054	0.060	.094-80
MT094-1	0.120	0.035	0.156	0.135	0.072	0.030	.120-80
MT094-2	0.120	0.035	0.156	0.135	0.072	0.075	.120-80
MT094-3	0.240	0.035	0.156	0.135	0.072	0.075	.120-80
MT094-4	0.240	0.035	0.156	0.135	0.072	0.148	.120-80
MT156-1	0.125	0.037	0.220	0.210	0.125	0.023	.190-64
MT156-2	0.250	0.037	0.220	0.210	0.125	0.148	.190-64
MT190-1	0.130	0.035	0.280	0.267	0.160	0.025	.234-64
MT190-2	0.187	0.031	0.280	0.267	0.160	0.106	.234-64
MT190-3	0.210	0.035	0.280	0.267	0.160	0.106	.234-64
MT190-4	0.210	0.035	0.280	0.267	0.160	0.180	.234-64
MT190-5	0.360	0.145	0.280	0.267	0.160	0.255	.234-64
MT190-6	0.450	0.240	0.280	0.267	0.160	0.340	.234-64

*Nut is .114 diameter by .070 thick and threaded bushing is slotted.



METALLIC ROTORS

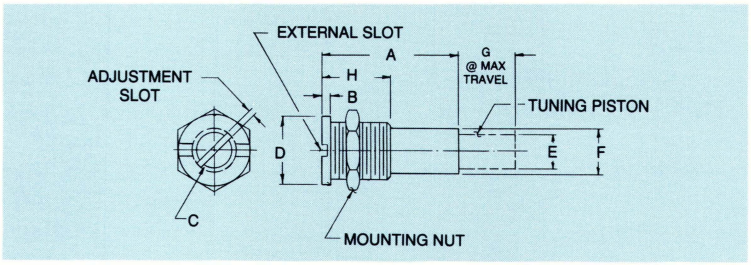
Part Number	A	B	C	Thread UNS-2
MR094-1	0.122	0.030	0.072	.094-80
MR094-2	0.167	0.075	0.072	.094-80
MR094-3	0.240	0.148	0.072	.094-80
MR156-1	0.125	0.023	0.125	.156-64
MR156-2	0.250	0.148	0.125	.156-64
MR190-1	0.210	0.106	0.160	.190-64
MR190-2	0.359	0.255	0.160	.190-64
MR190-3	0.449	0.345	0.160	.190-64
MR190-4	0.554	0.450	0.160	.190-64



IN	0.009	0.010	0.023	0.025	0.030	0.031	0.035	0.037	0.047	0.054	0.060	0.062	0.072	0.075	0.094	0.100	0.106	0.114	0.120	0.122	0.125	0.130	0.135	0.144	0.145	0.148
MM	0.23	0.25	0.58	0.64	0.76	0.79	0.89	0.94	1.19	1.37	1.52	1.57	1.83	1.91	2.39	2.54	2.69	2.90	3.05	3.10	3.18	3.30	3.43	3.66	3.68	3.76
IN	0.152	0.156	0.160	0.167	0.180	0.187	0.190	0.195	0.210	0.220	0.232	0.234	0.240	0.250	0.255	0.267	0.270	0.280	0.281	0.300	0.312	0.340	0.345	0.354	0.359	0.360
MM	3.86	3.96	4.06	4.24	4.57	4.75	4.83	4.95	5.33	5.59	5.89	5.94	6.10	6.35	6.48	6.78	6.86	7.11	7.14	7.62	7.92	8.64	8.76	8.99	9.12	9.14
IN	0.369	0.394	0.420	0.430	0.449	0.450	0.475	0.494	0.495	0.500	0.550	0.554	0.625	0.674	0.700	0.750	0.874	0.884	1.000							
MM	9.37	10.01	10.67	10.92	11.40	11.43	12.07	12.55	12.57	12.70	13.97	14.07	15.88	17.12	17.78	19.05	22.20	22.45	25.40							

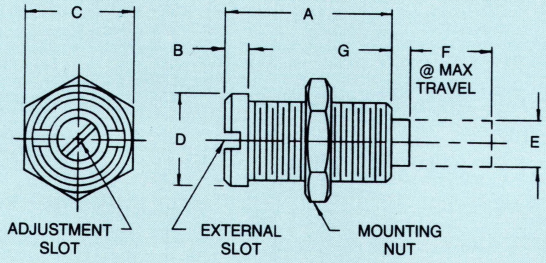
LC TUNING ELEMENTS

Part Number	A	B	C	D	E	F	G	H	Thread UNS-2
LCT-1	0.700	0.047	0.145	0.281	0.160	0.210	0.250	0.232	.250-64
LCT-2	1.000	0.047	0.145	0.281	0.160	0.210	0.375	0.232	.250-64



DIELECTRIC TUNING ELEMENTS

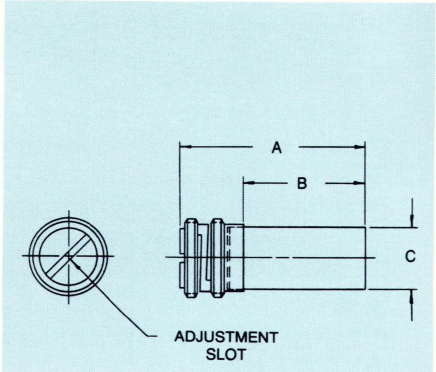
Part Number	A	B	C	D	E	F	G	Thread UNS-2	Dielectric Material
DT190-1	0.210	0.035	0.280	0.267	0.152	0.106	0.009	.234-64	Sapphire
DT190-2	0.359	0.144	0.280	0.267	0.152	0.255	0.010	.234-64	Sapphire
DT190-3	0.359	0.144	0.280	0.267	0.152	0.255	0.270	.234-64	Alumina



DIELECTRIC ROTORS

Part Number	A	B	C	Thread UNS-2	Dielectric Material
DR067-1	0.494	0.394	0.030	1.7mm-0.2mm*	Sapphire
DR067-2	0.494	0.394	0.030	1.7mm-0.2mm*	Alumina
DR067-3	0.494	0.394	0.030	1.7mm-0.2mm*	Quartz
DR190-1	0.369	0.195	0.062	.190-64	Alumina
DR190-2	0.674	0.500	0.062	.190-64	Alumina
DR190-3	0.874	0.700	0.062	.190-64	Sapphire
DR190-4	0.375	0.220	0.152	.190-64	Alumina
DR190-5	0.439	0.300	0.152	.190-64	Alumina
DR190-6	0.503	0.345	0.152	.190-64	Alumina
DR190-7	0.567	0.420	0.152	.190-64	Alumina
DR190-8	0.649	0.495	0.152	.190-64	Alumina
DR190-9	0.904	0.750	0.152	.190-64	Alumina

* Threads are metric.



Glass and Quartz Trimmer Capacitors
General Specifications

DESIGN FEATURES

The unique Voltronics non-rotating precision trimmer capacitor design offers the following advantages over conventional rotating types:

- Linear tuning with no reversals
- A true high frequency device with high Q's, low RF losses, low constant inductance and high self-resonant frequencies
- A superior seal because the screw head and O-ring do not move in and out
- Greater life - 10,000 cycles minimum
- Much smaller sealed MIL sizes
- Ability to provide extended metal or plastic shafts

DIELECTRIC

The dielectric is a tube which has been precision drawn in a vacuum so that its inner diameter is held within ±0.0002". The choices are:

1. **Annular Band Glass:** A solid tube of a specially-selected formulation of glass which is metallized on the outside.
2. **Embedded Band Glass:** Two tubes of glass fired together with a metallized silver band embedded between them. The inner tube is only 0.005" thick to provide much higher capacitance values.
3. **Quartz:** A pure-grade silicon oxide offering higher Q and voltage ratings in each size with the trade-off of lower capacitance and higher cost.

GENERAL SPECIFICATIONS
(where not specified on detail pages)

PISTON ACTION
Non-rotating

BLIND HOLE TUNING
Screw head does not move in and out

LINEARITY
± 1% with no capacitance reversals

RESOLUTION
#2-72 tuning screw for fine tuning—approximate pico-farads per turn in active tuning range:

1. Annular band glass	.6 to .8
2. Embedded band glass	2.3 to 3.0
3. Quartz	.3 to .36
4. "H" Series high range glass	3.9 to 4.2

INSULATION RESISTANCE
Annular band glass and quartz:
10^6 Megohms at 25° C to 125° C
Embedded band glass: 10^6 Megohms at 25° C
10^5 Megohms at 125° C

TUNING TORQUE
1 to 8 inch ounces

LIFE
Over 10,000 cycles

TEMPERATURE COEFFICIENT
Annular Band Glass: ±50 ppm/° C
Embedded Band Glass: ±150 ppm/° C
Quartz: 0 to +50 ppm/° C

DIELECTRIC WITHSTANDING VOLTAGE
Twice DC working voltage (listed with each part)

CAPACITANCE TUNING RANGE
From below minimum to above maximum value listed for each part. Capacitance measured at 1 MHz on Boonton Electronics 7600 bridge using Voltronics V1265 guarded test jig. **All measurements taken with leads perpendicular to unit regardless of final configuration.**

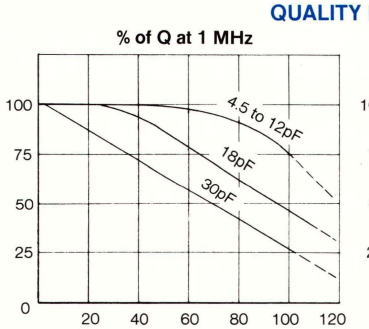
TEMPERATURE RANGE

All glass dielectrics:	-55° C to 125° C
Quartz dielectric:	-55° C to 150° C

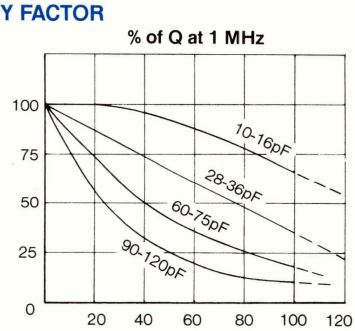
OTHER SPECIFICATIONS
All other specifications including vibration, shock, moisture and seal (where applicable) per MIL-C-14409D

DRAWING TOLERANCES (WHERE NOT SPECIFIED)
Decimal: XXX ± .016"
XX ± .03"

QUALITY FACTOR



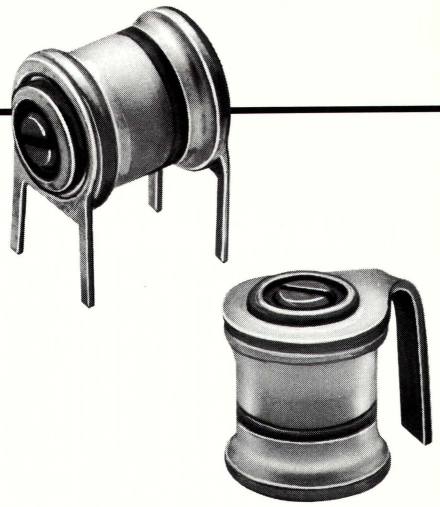
ANNULAR BAND CAPACTORS



EMBEDDED BAND CAPACITORS

Recommended Tuning Tool: TT-100 or TT-600

"S" SERIES - Smallest Sealed Glass MIL Trimmer Capacitors



The PC17 styles are the only vertically mounted glass trimmers in MIL-C-14409D.

Voltronics "S" Series are up to 40% shorter with 25% more range than any other sealed standard glass P.C. trimmers. The use of Voltronics' unique non-rotating piston design provides linear tuning, high "Q", long life, and high self-resonant frequencies. The O-ring seal assures protection up to 40 p.s.i. against dust, moisture, flux, solder, and cleaning solvents.

FIGURE 1

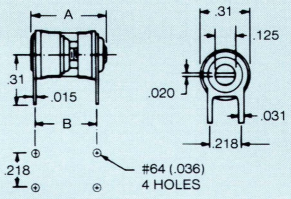


FIGURE 2

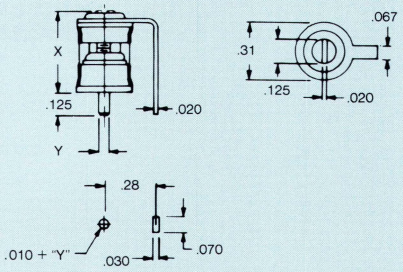
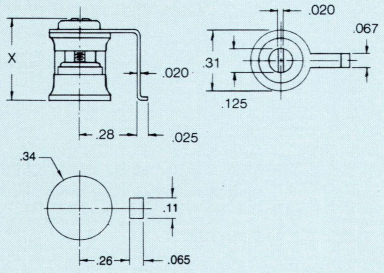


FIGURE 3



Dielectric	Capacitance Range (pF) From Below	Capacitance Range (pF) To Above	Q (Min.) at 1 MHz	Horizontal Mount Figure 1 Type	A ± .06	B ± .03	Vertical Mount* Figure 2 Type	MIL Designation	X ± .03	Surface Mount Figure 3 Type	X ± .03
ANNULAR BAND GLASS	1.0	5.5	1000	SP6	.420	.350	SF6A	PC17J5R5	.390	SM6	.390
	1.0	8.5	650	SP8	.575	.505	SF8A	PC17J8R5	.535	SM8	.535
EMBEDDED BAND GLASS	1.5	10	800	SP10	.370	.300	SF10A	PC17G100	.340	SM10	.340
	1.5	20	800	SP20	.440	.370	SF20A	PC17G200	.410	SM20	.410
	1.5	30	800	SP30	.520	.450	SF30A	PC17G300	.490	SM30	.490
	1.5	40	800	SP40	.630	.560	SF40A	PC17G400	.600	SM40	.600

"Y" dimension-standard-.040". For non-standard, change "A" in type number to "B" for .063" or "C" for .093".
*SF styles available with dual leads from top similar to AF styles on page 4.

General specifications of page 22 apply except:

1. DC Working Voltage: 250
2. Tuning torque: 0.5 to 5 inch ounces
3. Tolerance: XXX ± .005

IN	MM	IN	MM
0.005	0.13	0.340	8.64
0.010	0.25	0.350	8.89
0.015	0.38	0.370	9.40
0.020	0.51	0.390	9.91
0.030	0.76	0.410	10.41
0.031	0.79	0.420	10.67
0.036	0.91	0.440	11.18
0.040	1.02	0.450	11.43
0.063	1.60	0.490	12.45
0.067	1.70	0.505	12.83
0.070	1.78	0.520	13.21
0.093	2.36	0.535	13.59
0.125	3.18	0.560	14.22
0.218	5.54	0.575	14.61
0.28	7.11	0.600	15.24
0.30	7.62	0.630	16.00
0.31	7.87		

"TP" & "QP" SERIES - Horizontal P.C. Mount Glass and

FIG. 1

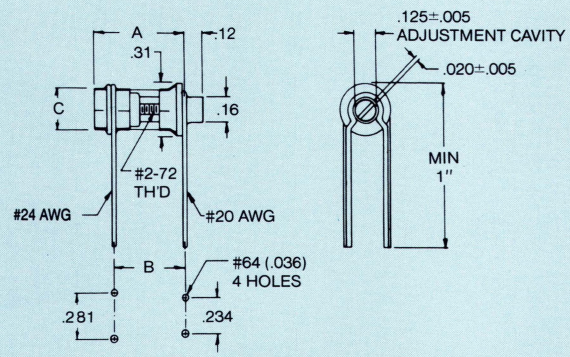


FIG. 2

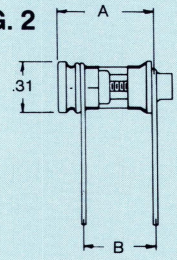


FIG. 3

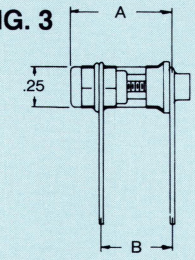
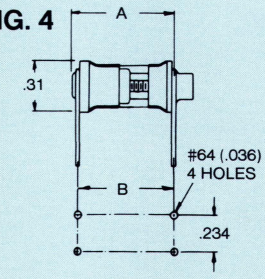


FIG. 4



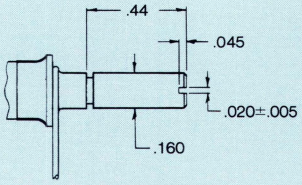
NOTES:

1. All Fig. 2 thru Fig. 4 parts have same end view as Fig. 1. Fig's 2 and 3 have mounting dimensions of Fig. 1
2. C diameter of Fig. 1 parts .27 for embedded band and .25 on all other parts.

Detailed General Specifications on Page 22

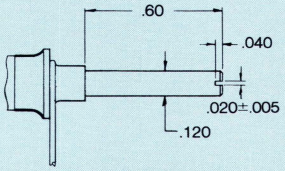
Optional Configurations

EXTENDED PLASTIC SHAFT



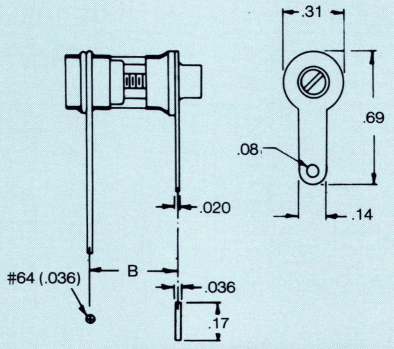
Add "EI" to Type Number
(ex. TP9CEI)

EXTENDED METAL SHAFT



Add "E" to Type Number
(ex. TP9E)

PRINTED CIRCUIT LUG



Add "L" to Type Number
(ex. TP28L)

GLASS ANNULAR BAND

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
0.8	4.5	650
0.8	5.5	700
0.8	8.5	650
1.0	11.0	700
0.8	12.0	650
0.8	16.0	700
0.8	18.0	650
0.8	21.0	700
0.8	23.0	700
0.8	30.0	650
0.8	38.0	700

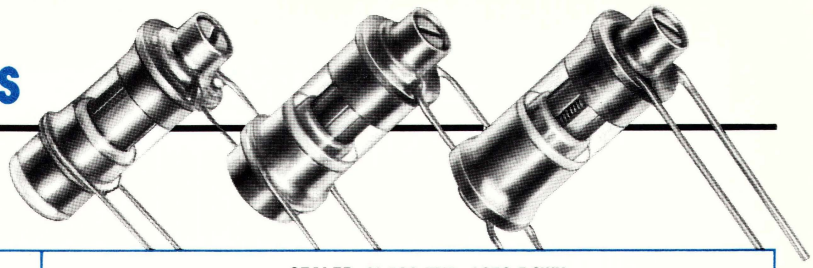
GLASS EMBEDDED BAND

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
1.2	10.0	800
1.0	14.0	700
1.2	16.0	800
1.0	16.0	800
2.0	25.0	800
1.0	28.0	700
1.0	36.0	800
1.0	42.0	700
1.0	52.0	800
1.0	60.0	650
1.0	75.0	700
1.0	90.0	600
1.0	120.0	600
2.0	180.0	500

QUARTZ

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
0.6	1.8	2000
0.6	5.5	2000
0.6	9.5	2000
0.8	16.0	2000

Quartz Trimmer Capacitors



UNSEALED 750 DCWV (Fig. 1)				SEALED, METAL CAP 750 DCWV (Fig. 2)			SEALED, GLASS END, 1250 DCWV						
							SMALLER (Fig. 3)			LARGER MIL SIZE (Fig. 3)			
A±.03	B±.03	Type	MIL Designation	A±.03	B±.03	Type	A±.03	B±.03	Type	A±.06	B±.03	Type	MIL Designation
.31	.25	TP5	PC41J4R5**	—	—	—	.39	.25	TP5G	.63	.50	TP5GA	PC42J4R5**
.31	.25	TP6	PC51J5R5	—	—	—	.39	.25	TP6G	.59	.50	TP6GA	PC52J5R5
.56	.44	TP9	PC41J8R5**	.58	.44	TP9C	.61	.44	TP9G	.88	.70	TP9GA	PC42J8R5**
.56	.44	TP11	PC51J110	.58	.44	TP11C	.61	.44	TP11G	.84	.70	TP11GA	PC52J110
.77	.63	TP12	PC41H120**	.78	.63	TP12C	.83	.63	TP12G	1.08	.84	TP12GA	PC42H120**
.77	.63	TP17	PC51H160	.78	.63	TP17C	.83	.63	TP17G	1.05	.84	TP17GA	PC52H160
1.03	.88	TP18	PC41H180**	1.05	.88	TP18C	1.08	.88	TP18G	1.33	1.02	TP18GA	PC42H180**
1.14	1.00	TP21	—	1.17	1.00	TP21C	—	—	—	—	—	—	—
1.03	.88	TP23	PC51H230	1.05	.88	TP23C	1.08	.88	TP23G	1.30	1.02	TP23GA	PC52H230
1.61	1.38	TP30	PC41H300**	1.64	1.38	TP30C	1.67	1.38	TP30G	1.92	1.47	TP30GA	PC42H300**
1.61	1.38	TP38	PC51H380	1.64	1.38	TP38C	1.67	1.38	TP38G	1.89	1.47	TP38GA	PC52H380

UNSEALED 1000 DCWV (Fig. 1)			SEALED, METAL CAP, 1000 DCWV SMALLER (Fig. 4)			SEALED, METAL CAP, 1000 DCWV LARGER MIL SIZE (Fig. 4)			
A±.03	B±.06	Type	A±.03	B±.06	Type	A±.03	B±.06	Type	MIL Designation
.28	.25	TP10*	.35	.33	TP10C*	—	—	—	—
.39	.33	TP14	.45	.42	TP14C	.73	.69	TP14CA	—
.33	.28	TP15*	.41	.39	TP15C*	—	—	—	—
.39	.33	TP16	.45	.42	TP16C	.73	.69	TP16CA	PC43G160
.44	.36	TP25	.50	.47	TP25C	—	—	—	—
.63	.50	TP28	.70	.67	TP28C	.97	.92	TP28CA	—
.63	.50	TP36	.70	.67	TP36C	.97	.92	TP36CA	PC43G360
.84	.73	TP42	.91	.88	TP42C	1.19	1.14	TP42CA	—
.84	.73	TP52	.91	.88	TP52C	1.19	1.14	TP52CA	PC43G520
1.09	.91	TP60	1.16	1.13	TP60C	1.42	1.38	TP60CA	—
1.09	.91	TP75	1.16	1.13	TP75C	1.42	1.38	TP75CA	PC43G750
1.69	1.52	TP90	1.75	1.73	TP90C	2.03	1.98	TP90CA	—
1.69	1.52	TP120	1.75	1.73	TP120C	2.03	1.98	TP120CA	PC43G121
1.92	1.73	TP180*	1.98	1.95	TP180C*	—	—	—	—

UNSEALED, 750 DCWV (Fig. 1)				SEALED, QUARTZ END, 1250 DCWV						
				SMALLER (Fig. 3)			LARGER MIL SIZE (Fig. 3)			
A±.03	B±.03	Type	MIL Designation	A±.03	B±.03	Type	A±.03	B±.06	Type	MIL Designation
.31	.25	QP2	PC41Q1R8	.38	.25	QP2G	.63	.50	QP2GA	PC42Q1R8
.56	.44	QP6	PC41Q5R5	.64	.44	QP6G	.89	.70	QP6GA	PC42Q5R5
1.00	.88	QP10	PC41Q9R5	1.09	.88	QP10G	1.33	1.02	QP10GA	PC42Q9R5
1.61	1.38	QP16	PC41Q160	1.69	1.38	QP16G	1.92	1.47	QP16GA	PC42Q160

IN	MM	IN	MM
0.005	0.13	0.92	23.37
0.020	0.51	0.97	24.64
0.03	0.76	1.00	25.40
0.036	0.91	1.02	25.91
0.040	1.02	1.03	26.16
0.045	1.14	1.05	26.67
0.06	1.52	1.08	27.43
0.08	2.03	1.09	27.69
0.12	3.05	1.13	28.70
0.125	3.18	1.14	28.96
0.14	3.56	1.16	29.46
0.16	4.06	1.17	29.72
0.17	4.32	1.19	30.23
0.234	5.94	1.33	33.78
0.25	6.35	1.38	35.05
0.27	6.86	1.42	36.07
0.28	7.11	1.47	37.34
0.281	7.14	1.52	38.61
0.31	7.87	1.61	40.89
0.33	8.38	1.64	41.66
0.35	8.89	1.67	42.42
0.36	9.14	1.69	42.93
0.38	9.65	1.73	43.94
0.39	9.91	1.75	44.45
0.41	10.41	1.92	48.77
0.42	10.67	1.95	49.53
0.44	11.18	1.98	50.29
0.45	11.43	2.03	51.56
0.47	11.94		
0.50	12.70		
0.56	14.22		
0.58	14.73		
0.60	15.24		
0.61	15.49		
0.63	16.00		
0.64	16.26		
0.67	17.02		
0.69	17.53		
0.70	17.78		
0.73	18.54		
0.77	19.56		
0.78	19.81		
0.83	21.08		
0.84	21.34		
0.88	22.35		
0.89	22.61		
0.91	23.11		

*Parts Rated 500 DCWV **MIL-C-14409B parts not listed in MIL-C-14409D

"TM" & "QM" SERIES - Panel Mount Glass and Quart

FIG. 1

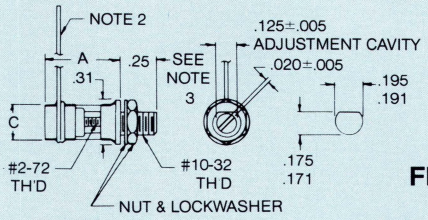


FIG. 2

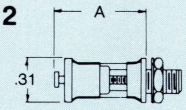


FIG. 3

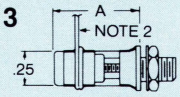
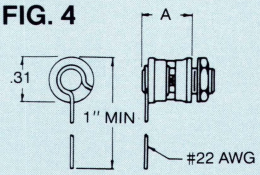


FIG. 4



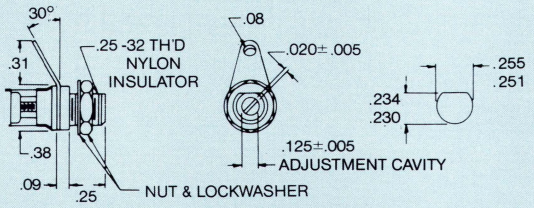
NOTES:

1. Fig. 2, 3 and 4 parts have same end view as Fig. 1.
2. All leads #22 AWG and 2" Min. long except for all TM5-, TM6-, TM10- and QM2- parts which are #24 AWG.
3. Mounting bushing #10-32 x .25 long except for all TM10- and TM15- parts which are #10-32 x .16 long.
4. C diameter of Fig. 1 parts .27 on embedded band units and .25 on all other parts.

Detailed General Specifications on Page 22

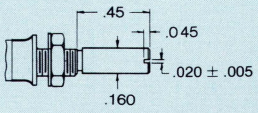
Optional Configurations

INSULATED BUSHING



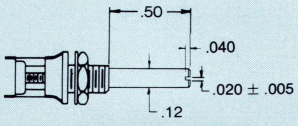
Insert "I" Between "T" and "M" in Type Number(ex.TIM9C)

EXTENDED PLASTIC SHAFT



Add "EI" to End of Type Number (ex. TM9EI)

EXTENDED METAL SHAFT



Add "E" to End of Type Number (ex. TM9CE)

GLASS ANNULAR BAND

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
0.8	4.5	650
0.8	5.5	700
0.8	8.5	650
1.0	11.0	700
0.8	12.0	650
0.8	16.0	700
0.8	18.0	650
0.8	21.0	700
0.8	23.0	700
0.8	30.0	650
0.8	38.0	700

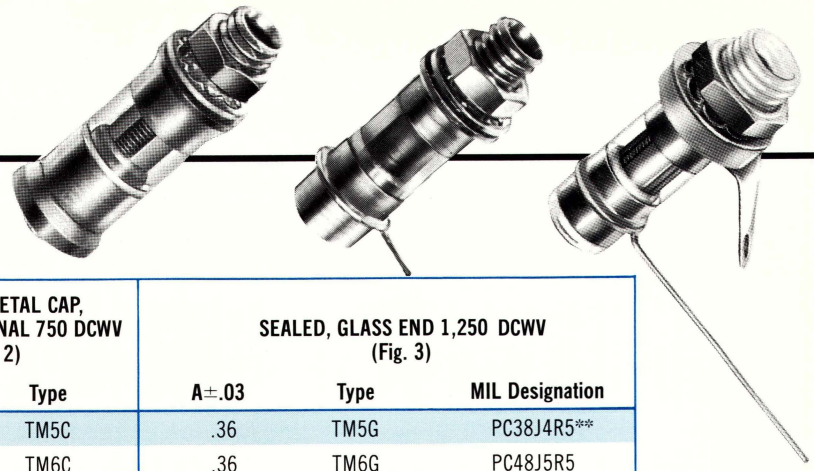
GLASS EMBEDDED BAND

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
1.2	10.0	800
1.0	14.0	700
1.2	16.0	800
1.0	16.0	800
2.0	25.0	800
1.0	28.0	700
1.0	36.0	800
1.0	42.0	700
1.0	52.0	800
1.0	60.0	650
1.0	75.0	700
1.0	90.0	600
1.0	120.0	600
2.0	180.0	500

QUARTZ

Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz
0.6	1.8	2000
0.6	5.5	2000
0.6	9.5	2000
0.8	16.0	2000

Trimmer Capacitors



UNSEALED 750 DCWV (Fig. 1)			SEALED, METAL CAP, TURRET TERMINAL 750 DCWV (Fig. 2)		SEALED, GLASS END 1,250 DCWV (Fig. 3)		
A±.03	Type	MIL Designation	A±.03	Type	A±.03	Type	MIL Designation
.31	TM5	PC40J4R5**	.41	TM5C	.36	TM5G	PC38J4R5**
.31	TM6	PC50J5R5	.41	TM6C	.36	TM6G	PC48J5R5
.55	TM9	PC40J8R5**	.63	TM9C	.59	TM9G	PC38J8R5**
.55	TM11	PC50J110	.63	TM11C	.59	TM11G	PC48J110
.75	TM12	PC40H120**	.83	TM12C	.81	TM12G	PC38H120**
.75	TM17	PC50H160	.83	TM17C	.81	TM17G	PC48H160
1.00	TM18	PC40H180**	1.09	TM18C	1.06	TM18G	PC38H180**
1.13	TM21	—	1.22	TM21C	—	—	—
1.00	TM23	PC50H230	1.09	TM23C	1.06	TM23G	PC48H230
1.59	TM30	PC40H300**	1.69	TM30C	1.66	TM30G	PC38H300**
1.59	TM38	PC50H380	1.69	TM38C	1.66	TM38G	PC48H380

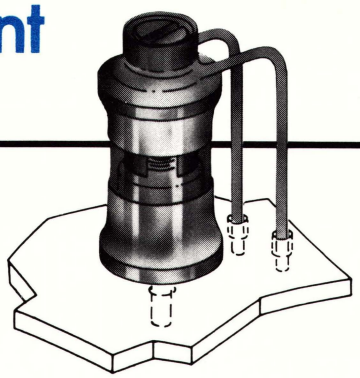
UNSEALED 1,000 DCWV (Fig. 1)		SEALED, METAL CAP, TURRET TERMINAL 1,000 DCWV (Fig. 2)			SEALED, METAL CAP 1,000 DCWV (Fig. 4)	
A±.016	Type	A±.03	Type	MIL Designation	A±.03	Type
.28	TM10*	.37	TM10C*	—	.35	TM10M*
.38	TM14	.47	TM14C	—	.45	TM14M
.33	TM15*	.42	TM15C*	—	.40	TM15M*
.38	TM16	.47	TM16C	PC39G160	.45	TM16M
.42	TM25	.52	TM25C	—	.50	TM25M
.61	TM28	.70	TM28C	—	.69	TM28M
.61	TM36	.70	TM36C	PC39G360	.69	TM36M
.83	TM42	.92	TM42C	—	.91	TM42M
.83	TM52	.92	TM52C	PC39G520	.91	TM52M
1.08	TM60	1.17	TM60C	—	1.16	TM60M
1.08	TM75	1.17	TM75C	PC39G750	1.16	TM75M
1.67	TM90	1.77	TM90C	—	1.75	TM90M
1.67	TM120	1.77	TM120C	PC39G121	1.75	TM120M
1.91	TM180*	2.00	TM180C*	—	1.98	TM180M*

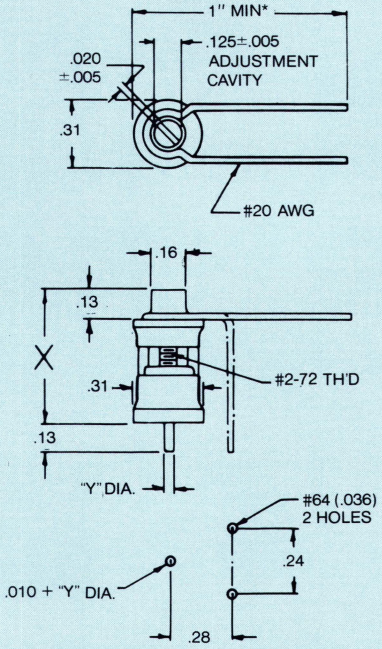
UNSEALED 750 DCWV (Fig. 1)			SEALED, QUARTZ END 1,250 DCWV (Fig. 3)		
A±.03	Type	MIL Designation	A±.03	Type	MIL Designation
.30	QM2	PC40Q1R8	.36	QM2G	PC38Q1R8
.55	QM6	PC40Q5R5	.63	QM6G	PC38Q5R5
.98	QM10	PC40Q9R5	1.06	QM10G	PC38Q9R5
1.59	QM16	PC40Q160	1.66	QM16G	PC38Q160

IN	MM
0.005	0.13
0.016	0.41
0.020	0.51
0.03	0.76
0.045	1.14
0.08	2.03
0.09	2.29
0.12	3.05
0.125	3.18
0.160	4.06
0.171	4.34
0.175	4.44
0.191	4.85
0.195	4.95
0.230	5.84
0.234	5.94
0.25	6.35
0.251	6.38
0.255	6.48
0.27	6.86
0.28	7.11
0.30	7.62
0.31	7.87
0.33	8.38
0.35	8.89
0.36	9.14
0.37	9.40
0.38	9.65
0.40	10.16
0.41	10.41
0.42	10.67
0.45	11.43
0.47	11.94
0.50	12.70
0.52	13.21
0.55	13.97
0.59	14.99
0.61	15.49
0.63	16.00
0.69	17.53
0.70	17.78
0.75	19.05
0.81	20.57
0.83	21.08
0.91	23.11
0.92	23.37
0.98	24.89
1.00	25.40
1.06	26.92
1.08	27.43
1.09	27.69
1.13	28.70
1.16	29.46
1.17	29.72
1.22	30.99
1.59	40.39
1.66	42.16
1.67	42.42
1.69	42.93
1.75	44.45
1.77	44.96
1.91	48.51
1.98	50.29
2.00	50.80

*Parts Rated 500 DCWV **MIL-C-14409B parts not listed in MIL-C-14409D

"TF" SERIES - Vertical P.C. Mount Glass Trimmer Capacitors

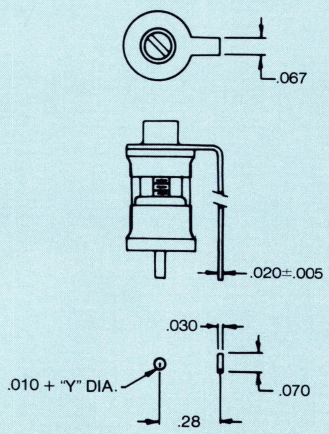




*1.25 in. on TF12, 17, 28, and 36 styles.

"Y" DIA: Standard units are .040. For different diameter pins substitute "B" — .063 or "C" — .093 for "A" in type number.

ALTERNATE DESIGN WITH RIBBON LEAD (add R to Type No.)



ANNULAR BAND

Type	Capacitance Range (pF) From Below	To Above	X ± .03	Q (Min.) 1 MHz	DCWV
TF5A	0.8	4.5	.47	650	750
TF6A	0.8	5.5	.47	700	750
TF8A	1.0	8.5	.62	700	750
TF9A	0.8	8.5	.70	650	750
TF11A	1.0	11.0	.70	700	750
TF12A	0.8	12.0	.90	650	750
TF17A	0.8	16.0	.90	700	750

EMBEDDED BAND

Type	Capacitance Range (pF) From Below	To Above	X ± .03	Q (Min.) 1 MHz	DCWV
TF10A	1.2	10.0	.43	800	500
TF14A	1.0	14.0	.53	700	1000
TF15A	1.2	16.0	.48	800	500
TF16A	1.0	16.0	.53	800	1000
TF22A	2.0	22.0	.58	800	500
TF25A	2.0	25.0	.58	800	500
TF28A	1.0	28.0	.77	700	1000
TF36A	1.0	36.0	.77	800	1000

General Specifications on Page 22

IN	0.005	0.010	0.020	0.03	0.036	0.040	0.063	0.067	0.070	0.093	0.125	0.13	0.16	0.24
MM	0.13	0.25	0.51	0.76	0.91	1.02	1.60	1.70	1.78	2.36	3.18	3.30	4.06	6.10

IN	0.28	0.31	0.43	0.47	0.48	0.53	0.58	0.62	0.70	0.77	0.90	1.00	1.25
MM	7.11	7.87	10.92	11.94	12.19	13.46	14.73	15.75	17.78	19.56	22.86	25.40	31.75

"H" SERIES - Extended Range Glass Trimmer Capacitors

FIG. 1

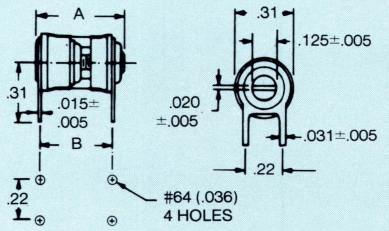


FIG. 2

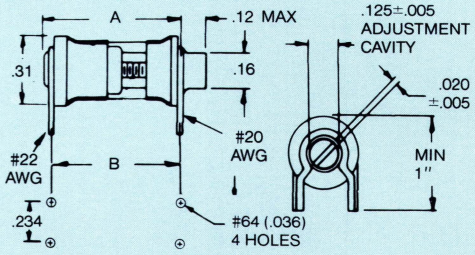


FIG. 3

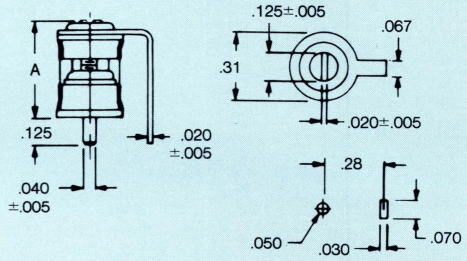


FIG. 4

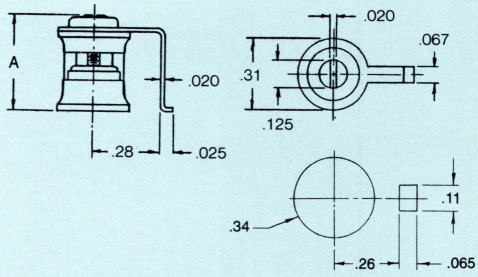
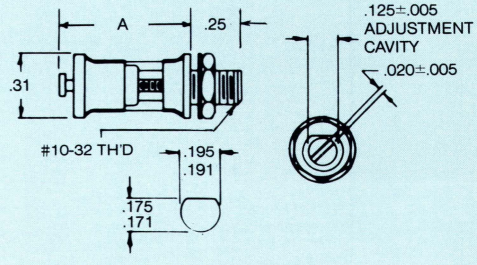


FIG. 5



The "H" Series increases the standard maximum capacitance values of Voltronics' glass trimmer capacitors by almost 100%. This is achieved by a new and unique technique which makes the wall of the inner glass tube thinner than was previously possible.

General specifications for the "H" Series are the same as those of standard embedded band glass trimmers (see Page 22) with the following exceptions:

DC Working Voltage: 125
Temperature Coefficient: -150 ±150 ppm/ °C

	Type	Capacitance Range (pF) From Below	To Above	Q (Min.) 1 MHz	Fig.	A ± .06	B ± .03
HORIZONTAL PRINTED CIRCUIT	HSP19	2	19	1000	1	.37	.30
	HSP34	2	34	900		.44	.37
	HSP46	2	46	800		.52	.45
	HSP64	2	64	700		.63	.56
	HTP96C	2	96	600	2	.91	.88
	HTP130C	2	130	500		1.16	1.13
	HTP210C	2	210	350		1.75	1.73
	HTP250C	2	250	250		1.98	1.95
						A ± .03	
VERTICAL PRINTED CIRCUIT	HSF19	2	19	1000	3	.34	
	HSF34	2	34	900		.41	
	HSF46	2	46	800		.49	
	HSF64	2	64	700		.60	
SURFACE MOUNT	HSM19	2	19	1000	4	.34	
	HSM34	2	34	900		.41	
	HSM46	2	46	800		.49	
	HSM64	2	64	700		.60	
PANEL MOUNT	HTM19C	2	19	1000	5	.37	
	HTM34C	2	34	900		.45	
	HTM46C	2	46	800		.52	
	HTM64C	2	64	700		.63	
	HTM96C	2	96	600	5	.92	
	HTM130C	2	130	500		1.17	
	HTM210C	2	210	350		1.77	
	HTM250C	2	250	250		2.00	

IN	0.005	0.015	0.020	0.030	0.031	0.036	0.040	0.050	0.06	0.067	0.070	0.12	0.125	0.16	0.171	0.175
MM	0.13	0.38	0.51	0.76	0.79	0.91	1.02	1.27	1.52	1.70	1.78	3.05	3.18	4.06	4.34	4.44
IN	0.191	0.195	0.22	0.234	0.25	0.28	0.30	0.31	0.34	0.37	0.41	0.44	0.45	0.49	0.52	0.56
MM	4.85	4.95	5.59	5.94	6.35	7.11	7.62	7.87	8.64	9.40	10.41	11.18	11.43	12.45	13.21	14.22
IN	0.60	0.63	0.88	0.91	0.92	1.00	1.13	1.16	1.17	1.73	1.75	1.77	1.95	1.98	2.00	
MM	15.24	16.00	22.35	23.11	23.37	25.40	28.70	29.46	29.72	43.94	44.45	44.96	49.53	50.29	50.80	

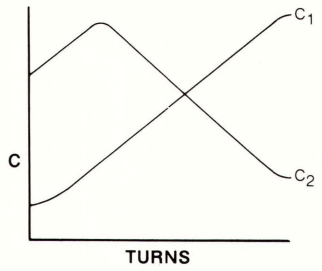
Differential Glass Trimmers

	Fig.	Capacitance (pF) Min. (1)	Min. (2)	Max. (1) (2)	Typical Crossover	A	B	C
TM3D	1	1.5	2.0	3	2.4	.31	—	.09
TM8D	1	1.5	2.5	8	5.5	.55	—	.22
TM12D	1	1.5	3.0	12	7.7	.75	—	.31
TM16D	1	1.5	3.5	16	10.1	.94	—	.41
TM28D	1	1.5	5.0	26	16.0	1.44	—	.66
TP3D	2	1.5	2.0	3	2.4	.31	.28	.09
TP8D	2	1.5	2.5	8	5.5	.55	.45	.22
TP12D	2	1.5	3.0	12	7.7	.75	.61	.31
TP16D	2	1.5	3.5	16	10.1	.94	.75	.41
TP28D	2	1.5	5.0	26	16.0	1.44	1.13	.66

NOTE: For sealed versions, add "G" to part number, ex. TM8DG. The "A" dimension will be 0.11" longer.

On a differential trimmer capacitor, the capacitance of one element increases while the other element decreases, with the sum remaining approximately constant.

DIFFERENTIAL STYLES



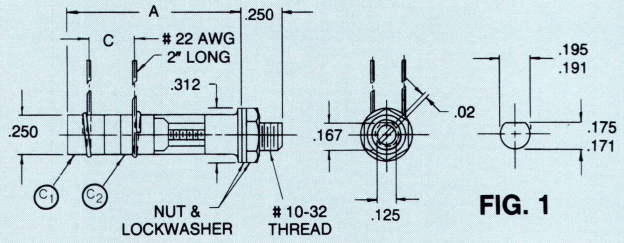


FIG. 1

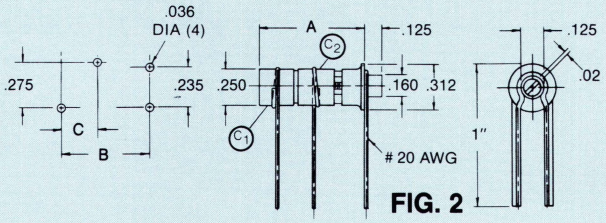


FIG. 2

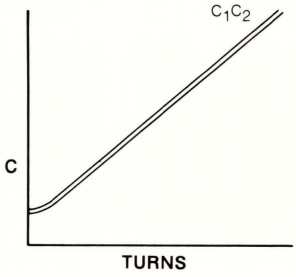
Split Stator Glass Trimmers

	Fig.	Capacitance (pF) Plate/Plate Min.	Plate/Plate Max.	Plate/Bushing Min.	Plate/Bushing Max.	A	B
TM4S	1	0.8	2.0	0.8	4.2	.55	—
TM9S	1	1.5	4.5	0.8	9.0	1.02	—
TM14S	1	2.0	7.0	1.0	14.0	1.67	—
TP4S	2	0.8	2.0	0.8	4.2	.55	.47
TP9S	2	1.5	4.5	0.8	9.0	1.02	.91
TP14S	2	2.0	7.0	1.0	14.0	1.67	1.53

NOTE: For sealed versions, add "G" to part number. ex. TM4SG. The "A" dimension will be 0.11" longer.

Both elements of a split stator trimmer tune at approximately the same rate.

SPLIT STATOR STYLES



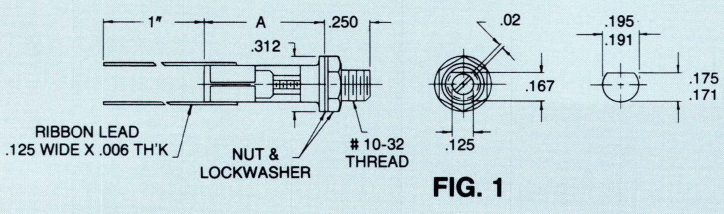


FIG. 1

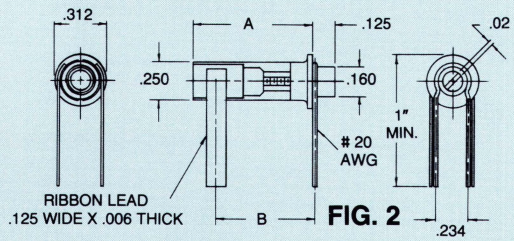


FIG. 2

IN	0.006	0.020	0.090	0.125	0.160	0.167	0.171	0.175	0.191	0.195	0.220	0.234	0.235	0.250	0.275	0.280	0.310
MM	0.15	0.51	2.29	3.18	4.06	4.24	4.34	4.45	4.85	4.95	5.59	5.94	5.97	6.35	6.99	7.11	7.87

IN	0.312	0.410	0.450	0.470	0.550	0.610	0.660	0.750	0.910	0.940	1.000	1.020	1.130	1.440	1.530	1.610	2.000
MM	7.92	10.41	11.43	11.94	13.97	15.49	16.76	19.05	23.11	23.88	25.40	25.91	28.70	36.58	38.86	40.89	50.80

General specifications of page 22 apply ex
1. DC Working Voltage: 500
2. Temperature coefficient: 0±100 ppm/°C.

Ceramic Trimmer Capacitors

Ceramic Trimmer Capacitors

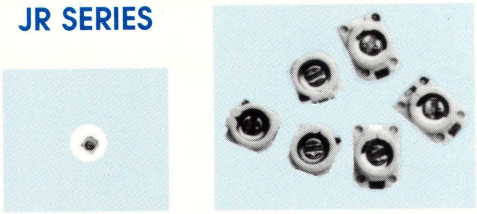
Smallest
PC Mount
Surface Mount

For additional information, ask for catalog R894

J SERIES - Ceramic Chip Trimmer Capacitors

SURFACE MOUNT AND WASHABLE

JR SERIES



JZ SERIES

THE J SERIES OUTPERFORMS ALL OTHER SIMILAR TRIMMERS

- TAPE AND REEL
- BOARD WASHABLE
- UP TO 50% HIGHER Q
- USABLE TO OVER 1 GHz
- MOST STABLE OVER TIME
- LOWEST CAPACITANCE DRIFT
- LOWEST TEMPERATURE COEFFICIENT
- NO EXPOSED METAL MECHANISM UNDER CAPACITOR
- EASIEST VACUUM PICKUP DUE TO FULL RING AROUND SCREW

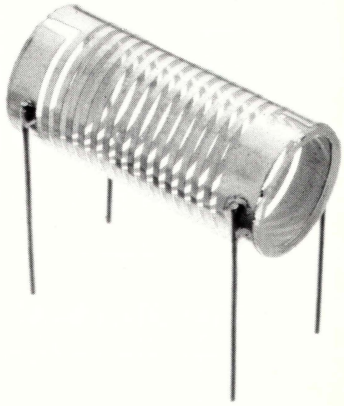
GENERAL WASHING SPECIFICATIONS

"J" Series parts can be used in most aqueous washing systems. Typical conditions under which the "J" series parts have been used successfully are:
Pressure: 25 - 35 PSI
Temperature: To 180°F
Oven drying: To 190°F or air pressure drying
Consult the factory if you have questions on your washing procedures.

For additional information, ask for catalog J794

Inductors - Fixed

Voltronics has the capability of metallizing coil patterns on a wide variety of sizes of glass, quartz or ceramic tubes. The following chart shows several values which are currently being manufactured. Call the factory to discuss specific requirements.



Part Number	Nominal Inductance	Min. Q	Test Frequency (MHz)	Self Resonant Frequency (MHz)	Length +/- .031	O.D. +/- .010
V2427	0.06 uh	140	150	800	0.51	.297
V2393	0.10 uh	150	100	650	0.61	.297
V2394	0.20 uh	140	70	500	1.02	.297
V2395	0.40 uh	130	50	330	1.02	.297
V2392	0.50 uh	150	160	850	1.00	.297
V2399	0.90 uh	120	40	230	1.11	.314
V2239	1.20 uh	100	25	170	1.05	.470

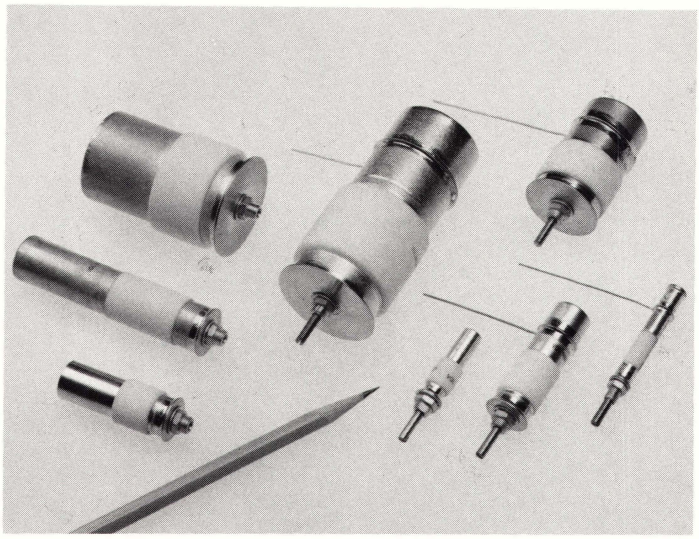
IN	0.010	0.031	0.060	0.225	0.230	0.234	0.250	0.251	0.255	0.270	0.297	0.314	0.375	0.470	0.510	0.610	0.750	1.000	1.02	1.05	1.100	1.11	1.500
MM	0.254	0.787	1.52	5.72	5.84	5.94	6.35	6.38	6.48	6.86	7.54	7.98	9.53	11.94	12.95	15.49	19.05	25.40	25.91	26.67	27.94	28.19	38.10

High Voltage Teflon Trimmer Capacitors

6KV TO 15KV

HIGH VOLTAGE APPLICATIONS

Voltronics new "NT" series of teflon trimmers are designed for applications requiring greater capacitance and voltage ratings than the popular smaller trimmers but without the large size and expense of vacuum capacitors.



THE "NT" LINE OFFERS:

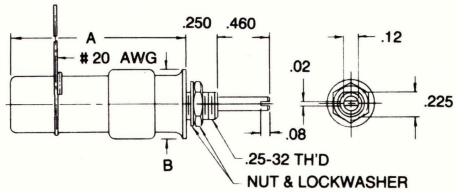
- High voltage, high Q & internal seal
- Non-rotating piston, long life & no tuning noise
- Extremely stable under shock & vibration
- Screw head does not move in & out

NOTE: All parts shown here can be ordered non-magnetic. See pages 16 and 17.

GENERAL SPECIFICATIONS

PART NUMBER DESIGNATIONS		Capacitance (pF)		Q (Min.)		Peak RF Voltage Rating 100 MHz	"A" Dim. ±.06	"B" Dim. ±.03
Configuration as shown on drawing	Same as drawing without extended shaft	From Below	To Above	25 MHz	100 MHz			
NT10-6E	NT10-6	1.0	10.0	2000	1000	6000	1.15	0.38
NT10-12E	NT10-12	2.0	10.0	1800	900	12000	1.83	0.63
NT15E	NT15	1.0	15.0	2000	800	4000	1.69	0.31
NT25-6E	NT25-6	5.0	25.0	2000	750	6000	1.62	0.63
NT25-15E	NT25-15	7.0	25.0	1500	700	15000	1.77	1.13
NT30E	NT30	4.0	30.0	1200	600	6000	2.25	1.50
NT50E	NT50	5.0	50.0	700	350	10000	2.25	1.50
NT70-6E	NT70-6	2.5	70.0	650	325	6000	3.00	0.70
NT70-15E	NT70-15	6.5	70.0	650	325	15000	3.25	1.63
NT85E	NT85	5.0	85.0	600	300	6000	3.25	1.50

NOTE: Add "NL" to end of part number to order part without #20 AWG lead



IN	0.020	0.080	0.120	0.225	0.250	0.310	0.380	0.460	0.630	0.700	1.130	1.150	1.500	1.620	1.630	1.690	1.770	1.830	2.250	3.000	3.25
MM	0.51	2.03	3.05	5.72	6.35	7.87	9.65	11.68	16.00	17.78	28.70	29.21	38.10	41.15	41.40	42.93	44.96	46.48	57.15	76.20	82.55

Recommended Tuning Tool: TT-100 or TT-600

Engineering Prototype Kits

Quantities and styles may be substituted in any kit as long as the total quantity does not change.

AIR TRIMMERS

"E" Series — Kit #201			"K" Series — Kit #204			"A" Series — Kit #205			"KE" Series — Kit #211		
Part #	Qty.	Range	Part #	Qty.	Range	Part #	Qty.	Range	Part #	Qty.	Range
ET10	3	0.6-10	KP8	3	0.6-8	AT10	3	1.0-10	KEP8	3	0.6-8
EP10	3	0.6-10	KP10	3	0.6-10	AP10	3	1.0-10	KEP10	3	0.6-10
EM10	3	0.6-10	KF8	3	0.6-8	AM10	3	1.0-10	KEF8	3	0.6-8
EF10	3	0.6-10	KF10	3	0.6-10	AF10	4	1.0-10	KEF10	3	0.6-10
ET14	4	0.6-14	KG8	2	0.6-8	AT14	4	1.0-14	KEG8	2	0.6-8
EP14	4	0.6-14	KG10	2	0.6-10	AP14	4	1.0-14	KEG10	2	0.6-10
EM14	4	0.6-14	KM8	2	0.6-8	AF14	4	1.0-14	KEM8	2	0.6-8
EF14	4	0.6-14	KM10	2	0.6-10	AT10E	4	1.0-14	KEM10	2	0.6-10

GLASS TRIMMERS

"S" Series — Kit #203			"TM/TP" Series — Kit #206			"H" Series — Kit #207		
Part #	Qty.	Range	Part #	Qty.	Range	Part #	Qty.	Range
SP10	2	1.5-10	TM36C	4	1-36	HSP19	3	2-19
SP20	2	1.5-20	TM60C	4	1-60	HSP34	3	2-34
SP30	2	1.5-30	TM120C	4	1-120	HSP64	2	2-64
SP40	2	1.5-40	TP52C	4	1-52	HSF19	3	2-19
SF10A	2	1.5-10	TP75C	4	1-75	HSF34	3	2-34
SF20A	2	1.5-20	TP120C	4	1-120	HSF64	2	2-64
SF30A	2	1.5-30						
SF40A	2	1.5-40						
SM10	2	1.5-10						
SM20	2	1.5-20						

SAPPHIRE TRIMMERS

"P" Series - Kit #209		
Part#	Qty.	Range
P3B	2	0.6-2.5
P3F	3	0.6-2.5
P5B	2	0.6-4.5
P5F	3	0.6-4.5
P8B	2	0.8-8.0
P8F	3	0.8-8.0

TEFLON TRIMMERS

"A-HV" Series - Kit #210		
Part#	Qty.	Range
AJ10HV	3	1-10
AP25HV	3	1-23
AT15HV	3	1-16

"A-40HV" Series - Kit #213		
Part#	Qty.	Range
AJ40HV	2	1.5-40
AP40HV	2	1.5-40
AT40HV	2	1.5-40

"A-SD" Series - Kit #212		
Part#	Qty.	Range
AJ25SD	4	1-23
AP25SD	4	1-23
AT25SD	4	1-23

Tuning Tools

Metal Tipped					Ceramic Tipped Non-Magnetic				
Part #	Fig.	A	B	Recommended For	Part #	Fig.	A	B	Recommended For
TT-100	1	.07	.012	All glass, air and sapphire styles	TT-500	2	.07	.016	All air styles
TT-200	1	.032	.008	All glass and air styles	TT-600	2	.10	.016	All glass styles

The TT-500 and TT-600 tuning tools are ideal for continual use. They fit into the hand with the rotatable top fixed in the palm. The tips are made of high strength ceramic. Use these tools where metal tips affect tuning.

FIG. 1

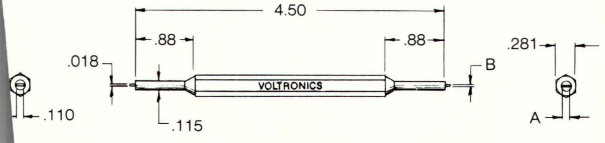
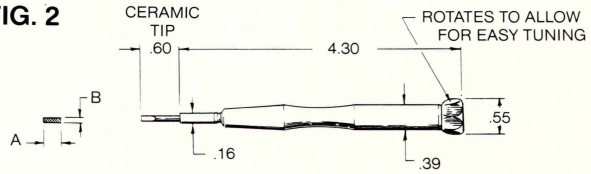


FIG. 2



ABOUT VOLTRONICS

Voltronics Corporation was founded in 1963 with the goal of creating a high performance glass trimmer capacitor which could operate under severe conditions of vibration, frequency and temperature. The Company's engineers designed a unique sealed non-rotating piston trimmer which achieved these goals. Engineers around the world specify Voltronics' trimmers in the most demanding applications.

The Company greatly expanded its line of precision trimmer capacitors. Each of Voltronics' product styles has its own unique design.

Voltronics continues to grow because we are always open to new ideas which will better suit the needs of our customers. Our "specials" number in the thousands. **If you cannot find the perfect part for your circuit in this catalog, call us and we'll design it.**

In November, 1991, Voltronics moved its two U.S. plants into a new, much larger building in Denville, N.J. We invite all our customers to visit our modern facility.

Quality Control

Voltronics Quality Control Department is approved by the Defense Electronics Supply Center to perform the testing required by MIL-C-14409D, the precision trimmer capacitor specification. Our quality control system conforms strictly to MIL-Q-9858 and MIL-I-45208. The complete facility is approved by all of the major electronics companies who have surveyed it. Special testing such as burn-in, thermal shock, and reliability screening can be performed.

Traceability

Voltronics maintains a strict traceability system throughout its plant. Each lot can be traced from the original raw material sources to the final inspector. Each lot and, where feasible, each part is date coded.

Voltronics
CORPORATION
The Trimmer Capacitor Company

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